EXHIBIT 7

THE FTC, IP, AND SSOS: GOVERNMENT HOLD-UP REPLACING PRIVATE COORDINATION

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ABSTRACT

In its recent report entitled, "The Evolving IP Marketplace," the Federal Trade Commission (FTC) proposes a far-reaching regulatory approach (Proposal) that is likely to interfere with the intellectual property (IP) marketplace, decreasing both the innovation and commercialization of new technologies. The FTC Proposal relies on non-standard and misguided definitions of economic terms of art such as "*ex ante*" and "hold-up," and advocates new inefficient rules for calculating damages for patent infringement. The Proposal would so reduce the costs of infringement that the rate of infringement would increase as potential infringers find it in their interest to abandon the voluntary market in favor of judicial pricing. As the number of nonmarket transactions increases, courts will play an ever larger role in deciding the terms on which the patented technologies of one party may be used by another party. That will do more than reduce the incentives for innovation; it will upset the current set of well-functioning private coordination activities in the IP marketplace that are needed to accomplish the commercialization of new technologies. And that would seriously undermine capital formation, job growth, competition, and the consumer welfare the FTC seeks to promote. Like the FTC Proposal, we focus here within the context of standard-setting organizations (SSOs), whose activities are key to bringing standardized technologies to market. If the FTC's proposed definitions of "reasonable royalties" and "incremental damages" become the rules for calculating patent damages the FTC and private actors will be well poised to attack, after the fact, all standard pricing methods

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through some combination of antitrust litigation or direct regulation on the ground that even time-honored voluntary royalty arrangements result from some purportedly undue power of IP. The FTC's Proposal may encourage potential licensees to adopt the very holdout strategies the FTC purports to address and that well-organized SSOs routinely counteract today. The FTC's proposal for regulating IP by limiting the freedom of SSOs to set their own terms would thereby replace private coordination with government hold-up. We conclude that the FTC should abandon its Proposal and support the current set of licensing tools that have fueled effective innovation and dissemination in the IP marketplace. FTC forbearance will improve bargaining incentives, reduce administrative costs, and remove unnecessary elements of legal uncertainty in the IP system, thereby advancing consumer welfare.

JEL: A11; A12; B15; B25; D02; D04; D18; D23; D29; D40; D43; D61; D72; D78; D86; K11; K20; K21; K23; K29; K39; K41; K42; L12; L14; L24; L40; L43; L44; L51; L63; N70; O31; O33; O34; P14

I. INTRODUCTION

The Federal Trade Commission (FTC) report entitled, "The Evolving IP Marketplace: Aligning Patent Notice and Remedies with Competition," ("Report") sets forth a proposal for a far-reaching regulatory approach ("Proposal") that, if adopted, would fundamentally distort and impede the intellectual property (IP) marketplace by disrupting three of its major institutions: (1) standard-setting organizations (SSOs); (2) markets; and (3) formal legal systems, such as the law of patents, property, and contract. These institutions are inter-dependent, such that the erosion of any one would significantly impede the others. Yet the FTC would disrupt each one, thereby injecting into the IP marketplace significant uncertainty and inefficiencies, ultimately harming consumer welfare. The 300 pages of the Report provide such extensive discussion that it is difficult to fairly capture the Proposal's full detail in any quick summary. Nevertheless, we directly quote several of the Proposal's key components in this Introduction to show that the Proposal's overall gist is to replace the current set of well-functioning private coordination activities in the IP marketplace with a new set of rules that will lead to a major expansion in the role of both courts and government agencies in setting prices for routine transactions in the IP marketplace.

To be sure, the FTC Proposal does not confer upon the agency any direct power to set the price of licenses. But, if implemented, the FTC Proposal would achieve that end through a long process that runs as follows. Beginning with a faulty premise about the overall value of IP, the new damages rules proposed by the FTC all suggest that the currently observed prices in licensing arrangements are too high and should instead be set in accordance with the FTC's own untested approaches to setting "reasonable

royalties" and "incremental damages," which are nowhere observed in the extensive practice within the industry. This is unwise because so long as such new approaches to setting value are made available to potential licensees as of right, they will have a strong incentive to abandon the voluntary market to obtain the benefit of such judicial pricing rules, which are systematically more favorable to their interests. In the short run, therefore, it is likely that fewer downstream parties will enter into licensing agreements—in effect, inviting patent holders to sue them in court, thereby creating major new risks of hold-up by downstream users. In addition, both the FTC and private parties may well seek to rely on the FTC Proposal as evidence that almost any license rates generated in the IP marketplace are too high. This skepticism about market rates may in turn make it too easy to invoke apprehensions about some "abuse of monopoly power" as justifications for either FTC or private actions under the antitrust law. The net impact from following the FTC Proposal's approach to determining IP value would be to reduce the rate of return to innovators, who will either leave the market or accept lower prices for their wares. None of this is necessary. It has long been established that the owner of a patent does not have any necessary monopoly power by virtue of its exclusive right to sell its patented technology.[1] A patentee always faces competition from three sources: other patented technologies, new technologies that have yet to reach the market, and those technologies that have already fallen into the public domain.[2]

The impact of the FTC's Proposal would be particularly harsh on SSOs, whose entire mode of operation is intended to avoid, through advance planning, the hold-up risks with respect to new technologies that the FTC wishes to avoid. Yet, by failing to appreciate the many procompetitive features of SSOs, the FTC Proposal could easily hamstring their use, thereby forcing ever greater reliance on systems of judicial or administrative pricing that are both costly to operate and uncertain in their effect. Strong damages for patent infringement are intended to sufficiently decrease the risk of infringement so that long-term cooperative efforts can strike the right balance between prices that are high enough to secure innovation and low enough to support its widespread dissemination. The failure to recognize how the various pieces of the full patent commercialization cycle fall into place makes it a virtual certainty that the FTC Proposal, if implemented, would yield a powerful government regulatory approach that will have only a

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[1] In this context, it is useful to note that the Supreme Court continues to reaffirm the rule that a patent does not create a presumption of market power in antitrust litigation. *See, e.g.*, Ill. Tool Works Inc. v. Independent Ink, Inc., 547 U.S. 28 (2006).

[2] *See, e.g.*, Kenneth W. Dam, *The Economic Underpinnings of Patent Law*, 23 J. LEGAL STUD. 247, 249-50 (1994) ("[T]he right to exclude another from 'manufacture, use, and sale' may give no significant market power, even when the patent covers a product that is sold in the market.").

blocking effect on the innovation and consumer welfare that the FTC seeks to promote.

Since its inception, the U.S. patent system's strong preference for private ordering of IP rights has been crucial to its economic success.[3] Last century's most recent significant overhaul to the U.S. patent system, the 1952 Patent Act, was specifically designed to restore predictable enforcement mechanisms for patents as a push-back against the erosion of patent rights that had occurred through the undermining of the patent system by overly aggressive antitrust regulation.[4] The 1952 Patent Act was purposefully designed to ensure that patents could better facilitate coordination among the many market participants in order to commercialize innovation.[5] In keeping with this view, patents have long been enforceable with injunctions structured to preserve for patentees the option to enter voluntary transactions on terms more favorable to them than those that might be imposed by infringers in the form of damages. In turn, patent damages awards have long been structured to ensure that patentees are no worse off when their patents have been infringed than they would have been had the manufacturer selected voluntary licensing rather than infringement. The combined effect of this approach to patent remedies is that parties in the patent marketplace are encouraged to contract with each other before or during the time frame in which the patented technology was put to significant use.

This approach was successful in increasing the commercialization of new technologies and increasing competition.[6] Participants in the patent marketplace developed a host of techniques for positively engaging with each other

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[3] *See, e.g.*, Naomi R. Lamoreaux & Kenneth L. Sokoloff, *Intermediaries in the U.S. Market for Technology, in* FINANCE, INTERMEDIARIES, AND ECONOMIC DEVELOPMENT 1870-1920 (Stanley L. Engerman, Philip T. Hoffman, Jean-Laurent Rosenthal & Kenneth L. Sokoloff eds., Cambridge Univ. Press 2003); B. Zorina Khan & Kenneth L. Sokoloff, *History Lessons: The Early Development of Intellectual Property Institutions in the United States*, 15 J. ECON. PERSP. 233 (2001).

[4] *See, e.g.*, Dawson Chem. Co. v. Rohm & Haas Co., 448 U.S. 176 (1980) (approvingly providing extensive review of legislative history of the 1952 Patent Act and its impact on the patent-antitrust interface). For more on the 1952 Patent Act's impact on the patent-antitrust interface, see F. Scott Kieff & Troy A. Paredes, *The Basics Matter: At the Periphery of Intellectual Property*, 73 GEO. WASH. L. REV. 174 (2004).

[5] Giles S. Rich, *The Relation Between Patent Practices and the Anti-Monopoly Laws*, 24 J. PAT. OFF. SOC'Y 241 (1942) (five-part series of articles written by principal drafter of the 1952 Patent Act); Reiner v. I. Leon Co., 285 F.2d 501, 503 (2d Cir. 1960) (Hand, J.) (noting "[t]here can be no doubt that the Act of 1952 meant to change the slow but steady drift of judicial decision that had been hostile to patents"); Lyon v. Bausch & Lomb Optical Co., 224 F.2d 530, 536-37 (2d Cir. 1955) (Hand, J.) (noting "§ 103...restores the original gloss... [A] legislature...must be free to reinstate the courts' initial interpretation, even though it may have been obscured by a series of later comments whose upshot is at best hazy."); Picard v. United Aircraft Corp., 128 F.2d 632, 643 (2d Cir. 1942) (Frank, C.J., concurring) (discussing the role of predictable rules for patent enforcement in helping a smaller "David" compete with a larger "Goliath").

[6] *See infra* Part IV.

against the backdrop of these rules. They entered into bilateral patent licenses; they set up multilateral organizations such as SSOs with established IP policies agreed upon by all members (for example, reasonable and non-discriminatory, or RAND, terms); they set up patent pools to license technologies from several companies that are essential to implement a standard; and they sometimes designed around patented technologies or properly took on the risk that they might infringe. Carefully developed over more than a century, these rules and practices have consistently led to growth in consumer welfare, jobs, and the overall economy.

The gist of the FTC Proposal would turn this positive achievement on its head. Particularly with respect to technology incorporated into standards, the FTC flips the goal of damages calculations by seeking to ensure that *infringers* are no worse off for having not entered into voluntary agreements with patentees.

The central problem with the FTC's approach is that it would interfere seriously with the helpful incentives to contract with one another that all parties in the IP marketplace presently have. The FTC's approach ignores the powerful incentives that it creates in putative licensees to spurn the voluntary market in order to obtain a strategic advantage over the licensor. In any voluntary market, the low rates that go to initial licensees reflect the uncertainty of the value of the patented technology at the time the license is issued. Once that technology has proven its worth, there is no sound reason to allow any potential licensee who held out from the originally offered deal to get bargain rates down the road. Allowing such an option would make the holdout better off than the contracting party. Such holdouts would not need to take licenses for technologies with low value, while resting assured they would still get technologies with high value at below market rates. The FTC seems to overlook that a well-functioning patent damage system should do more than merely calibrate damages after the fact—an efficient approach to damages is one that also reduces the number of infringements overall by making sure that the infringer cannot improve his economic position through his own wrong.

The FTC Proposal rests on the misguided conviction that the law should not allow a licensor to "demand and obtain royalty payments based on the infringer's switching costs"[7] once the manufacturer has "sunk costs into using the technology."[8] The FTC Proposal labels any such payments as the result of "hold-up."[9] The FTC focuses particular concern on "hold-up" in the context of standardized industries, arguing that "[o]nce a technology is incorporated into a standard, a firm with a patent reading on the technology

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[7] FED. TRADE COMM'N, THE EVOLVING IP MARKETPLACE: ALIGNING PATENT NOTICE AND REMEDIES WITH COMPETITION 22 (Mar. 2011) [hereinafter FTC REPORT].

[8] *Id.* at 8.

[9] *Id.*

can demand a royalty that reflects not only the value of the technology compared to alternatives, but also the value associated with investments made to implement the standard."[10]

Posing this state of affairs as the problem—without giving serious consideration to other incentives or constraints that may prevent the pricing behavior that the FTC fears—the FTC urges courts to solve that purported "problem" by weakening the remedies for patent infringement. Thus, for damages based on an estimated "reasonable royalty" in particular, the FTC advances an argument that hinges on three main steps.

The first step in the FTC's argument is to reinterpret the "willing licensor/willing licensee" approach of the traditional "hypothetical negotiation" method of determining a "reasonable royalty." The FTC insists that the "willing" requirement forbids a court in all cases from permitting any royalty that is higher than the royalty that the licensee would willingly have paid in a hypothetical negotiation with the licensor, conducted with perfect information in the *ex ante* state of the world. In so doing, the FTC essentially overlooks that both parties have to be willing, and therefore it improperly rejects as "inappropriate" the possibility that in some cases "the patentee would have rejected the maximum amount the infringer would have paid."[11] Instead, it confidently asserts that the innovator in the pre-standardization hypothetical negotiation "would rationally want to license the patent at the maximum amount the infringer would pay" (as opposed to declining to license).[12]

Unfortunately, this argument falls prey to a recurring ambiguity. It is not clear whether the FTC is asserting that this standard works as a cap on the rate *this* infringer would willingly have paid, or to the rate "*a* willing licensee" would have paid.[13] As we discuss later, the two prices may be very different.[14]

The second step in the FTC's argument would impose a direct and dramatic change in the existing law of "reasonable royalty" damage calculation by shifting the focus of such determinations onto the wrong time period. While existing law places the "hypothetical negotiation" at the time of first infringement, the FTC urges that, in order to avoid prices inflated by "hold-up," the hypothetical negotiation should always be fixed at a time before the infringer incurred any "sunk costs" in the form of infringement-specific investments,[15] regardless of when, and in what market context, the infringer actually benefited from its infringement. In the case of standardized technologies, the FTC argues that damages must always be calculated "at

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[10] *Id.*

[11] *Id.* at 168.

[12] *Id.*

[13] *Id.* at 20, 168.

[14] *See infra* Part IV.F.

[15] FTC REPORT, *supra* note 7, at 22.

the time the standard is chosen."[16] But, it seems as though the FTC means just before the standard is chosen because, according to the FTC's reasoning, the lock-in effect and hold-up potential are created by the act of standardization. This is particularly strange because, in the real world, standardization has evolved as a process that operates precisely to avoid the very hold-up problem that the FTC's new damage rule encourages.

The third step in the FTC's argument rests on the view that the maximum amount that the willing licensee would have paid in the pre-investment, pre-standardization hypothetical universe is constrained at an upper bound equal to the "incremental value of the patented invention over the next-best alternative."[17] Under that view, any price in excess of this incremental value must result from an abuse of hold-up power, which a judicial cap on damages would supposedly counteract.[18]

The combined effect of the FTC's three-step argument, especially within the context of standardized technologies, would be that royalties and damages awards must be kept no greater than "reasonable," as defined by the FTC's rule that focuses on "incremental value prior to standardization." Anything higher would be seen as the result of an exercise of "hold-up" power. Although the Report is carefully silent on this point, its logic strongly implies that even after a voluntary license is negotiated and entered into, any allegation that the agreed price is "unreasonable" under this definition might well support private or regulatory antitrust action, attacking the enforceability of the license rate and threatening punitive antitrust penalties against the licensor. In effect, rational business conduct by SSOs, whose major function is to avoid hold-up problems, is treated as a false source of minor abuse and set up as an excuse for facilitating truly pernicious abuse. Indeed, the harms from the FTC Proposal would be severe, including far more than a reduction in damage awards after a manufacturer has elected to infringe. The social costs from adopting the FTC Proposal would include decreased innovation as well as increased litigation costs from inappropriate agency actions and civil actions, and ultimately loss of value to consumers.

In summary, the FTC Proposal violates the first principle of sound administrative or legal reform: if it's not broken, don't fix it. Put differently, no one should propose major alterations in law without first identifying a systematic malfunctioning of the current marketplace. SSOs, with their consensually developed licensing policies, as well as licenses negotiated within the context of those policies, have proven their worth in the marketplace, in view of existing patent remedies principles, to an extent that is inconsistent with a call for fundamental change along the lines proposed by the FTC. Indeed, the FTC Report and Proposal are suggestive of serious examples of

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[16] *Id.* at 22-23, 168, 193.
[17] *Id.* at 21-22.
[18] *Id.*

government hold-up, of which many have been identified and studied in the literature.[19] The FTC should instead exercise forbearance and refrain from advocating legal changes that would have the effect of holding up the IP marketplace and harming consumers.

II. SSOs FACILITATE PRIVATE COORDINATION IN THE IP MARKETPLACE

We begin this Part by pointing out that market participants in the real world see things from a perspective that is dynamic, not static, which means that from a true "*ex ante*" perspective, the incentives facing all participants must be taken into account, rather than merely some of the incentives facing some of the participants at some points in time. We then review the way these dynamic incentives play out through the important role SSOs play in optimizing the entire chain of value-creating investment in the IP market-place. We explore the way SSOs harness their powerful incentives to balance the interests of both inventors and manufacturers to develop a track record of success for consumers. We conclude our discussion in this Part by explor-ing the way the FTC's Proposal would disrupt that role.

A. Standard Use of the Economic Term of Art "*Ex Ante*": The Time Before All Participants in the IP Marketplace Make Decisions

In its effort to justify its recommendations, the FTC begins with a non-standard use of the term "*ex ante*" that focuses only on some arbitrarily selected group—infringers after they have infringed—to advance a policy agenda.[20] But the term "*ex ante*" is used throughout the literature to refer to

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[19] For more on government hold-up of firms in regulated industries, see DANIEL F. SPULBER, REGULATION AND MARKETS 603 (1989); David Besanko & Daniel F. Spulber, *Sequential Equilibrium Investment by Regulated Firms*, 23 RAND J. ECON. 153 (1992); Yossef Spiegel & Daniel F. Spulber, *The Capital Structure of a Regulated Firm*, 25 RAND J. ECON. 424 (1994); and Yossef Spiegel & Daniel F. Spulber, *Capital Structure with Countervailing Incentives*, 28 RAND J. ECON. 1 (1997). On municipalities and their opportunism towards cable firms, see Mark Zupan, *Cable Franchise Renewals: Do Incumbent Firms Behave Opportunistically?*, 20 RAND J. ECON. 473 (1989). On government hold-up and related case law, see J. Gregory Sidak & Daniel F. Spulber, *Deregulatory Takings and Breach of the Regulatory Contract*, 71 N.Y.U. L. REV. 851 (1996); and J. GREGORY SIDAK & DANIEL F. SPULBER, DEREGULATORY TAKINGS AND THE REGULATORY CONTRACT: THE COMPETITIVE TRANSFORMATION OF NETWORK INDUSTRIES IN THE UNITED STATES (1997). For a more formal treatment of the present example of government hold-up at the interface between patents and antitrust, see Luke Froeb, Bernhard Ganglmair & Gregory J. Werden, *Patent Hold Up and Antitrust: How a Well-Intentioned Rule Could Retard Innovation* (Vanderbilt Law & Econ. Research Paper, Paper No. 11-3, 2010), *available at* http://ssrn.com/abstract=1735587.

[20] *Compare* FTC Report, *supra* note 7 at 7–8 ("Patent transactions that occur as part of a technology transfer agreement can be considered ex ante because they occur *before* the purchaser has obtained the technology through other means.") *with* FTC Report at 8 ("In many cases, the licensee or purchaser already uses the patented technology when approached to

the situation that exists before *all* market actors obtain information about the state of nature, including information about their situation and those of other market actors.[21] Market actors who make decisions *ex ante* act based on expectations—that is, before learning information about the state of nature. Indeed, the FTC's non-standard use of the term "*ex ante*" is also inconsistent with the connotation of "*ex ante*" that is sometimes used to describe the situation before parties form and invest in contractual relationships.[22] The bottom line is that the true *ex ante* perspective necessarily applies to potential patentees and potential infringers alike. The term "*ex ante*" must be applied symmetrically to all economic agents that form relationships, not only a select few.

From its specialized use of the term "*ex ante*," the FTC advocates imposing on the patent marketplace a set of rigid and uniform rules that no regular SSO participants would elect for themselves in a truly "*ex ante*" context. But, this proposed new legal regime would generate far more litigation and uncertainty as parties rationally elect to infringe and litigate rather than negotiate with each other. This new turn of events, in turn, would place courts in charge of deciding the "correct" pricing for patent licenses,

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by the patent owner, but it lacks a license to use the technology. These patent transactions occur ex post, *after* the firm accused of infringement has invested in creating, developing or commercializing the technology") (emphases in original). *See* also Mark A. Lemley, *Ex Ante Versus Ex Post Justifications for Intellectual Property*, 71 U. CHI. L. REV. 129 (2004). Lemley refers to a difference between a view of patents as providing incentives to inventors before inventions are made and a view of patents as providing incentives for patentees to control inventions after they have been made. But, that is a very specialized understanding of the terms "*ex ante*" and "*ex post*" focused entirely on the perspective of specific parties in particular, rather than in terms of how decisions are made over time by all parties in the innovation market. It also does not address the school of thought that led to the present U.S. patent system, the 1952 Patent Act, which views patents as tools for facilitating coordination rather than as direct incentives to invent or as tools for exercising control. *See* F. Scott Kieff, *An Inconvenient School of Thought*, 61 ALA. L. REV. 591 (2010), (reviewing MICHAEL CARRIER, INNOVATION FOR THE 21ST CENTURY: HARNESSING THE POWER OF INTELLECTUAL PROPERTY & ANTITRUST (2009)). The focus by the FTC and some academics on such particularized uses of the term "ex ante" may be an example of a regulatory form of behavioral cognitive bias. *See*, James C. Cooper & William E. Kovacic, *Behavioral Economics: Implications for Regulatory Behavior*, SSRN ID 1892078 (July 21, 2011), *available at* http://ssrn.com/abstract=1892078; F. Scott Kieff, *Coordination, Property & Intellectual Property: An Unconventional Approach to Anticompetitive Effects & Downstream Access*, 56 EMORY L. J. 327, 381–84 (2006); Troy A. Paredes, *Blinded by the Light: Information Overload and Its Consequences for Securities Regulation*, 81 WASH. U. L.Q. 417 (2003).

[21] For standard usage of the term "*ex ante*," see ROGER B. MYERSON, GAME THEORY: ANALYSIS OF CONFLICT 485-86 (1991) and JOHN P. BONIN & JEAN-JACQUES LAFFONT, THE ECONOMICS OF UNCERTAINTY AND INFORMATION 135 (1989).

[22] This corresponds to the so-called "fundamental transformation" that is the focus of the well-known discussion of hold-up by Williamson. *See, e.g.*, OLIVER WILLIAMSON, THE ECONOMIC INSTITUTIONS OF CAPITALISM: FIRMS, MARKETS, RELATIONAL CONTRACTING 61-63 (1985).

clogging the courts with unending disputes and preempting and impeding pricing and negotiation in the marketplace. This increased uncertainty and litigation, in turn, would lead to less investment in invention and its commercialization, decreasing manufacturers' options for deploying subsequent generations of technology, and thereby decreasing competition and consumer choice.

A useful thought experiment asks what the licensing and royalty rules are that members of a new SSO rationally would adopt in a truly "*ex ante*" setting—that is, at the outset of a new technology, before either inventors or manufacturers have made the investments necessary to the success of that technology. If the FTC's proposed rules would not be supported at this *ex ante* time, even by those potential licensees (that is, manufacturers) that they are ostensibly designed to protect, then it is hard to see how they could be economically optimal. Even if some manufacturers were tempted to see these rules as being in their short-term best interest, it would be apparent to them that such rules would not attract optimal investment by a potential inventor and its commercial partners (for example, innovators, as well as their financial investors and other contracting partners). Yet, to be economically viable, the rules need to attract and hold the constructive attention of the diverse set of participants in the patent marketplace. The century-old rules and practices have been shown to do just that, time and time again. However, the FTC's approach would displace these effective SSOs with new forms of government-aided hold-up.

B. The Successful Track Record of SSOs' Powerful Incentives to Balance the Interest of Inventors and Manufacturers

SSOs are voluntary institutions governed by rules and norms created by members, including both technology inventors and adopters, each with a vested interest in the successful creation and commercialization of new technologies. Each potential participant in an SSO anticipates that different technologies, IP rights, standards, and consumer demands can come and go. They also know that, along the way, these many changes necessarily have a range of impacts on each participant's business model as well as the overall economic success of the technology within this naturally evolved ecosystem. In addition, each SSO often has to wrestle with hundreds or thousands of patents and innumerable technical choices. And, unlike the settings that are most familiar to antitrust regulators (such as public utilities), the SSO setting typically involves technologies that are the recent fruits of high-risk research and development (R&D) investment and highly uncertain consumer demand. Consider just two recent examples of large investments in two competing standards for popular consumer technologies where only one ended up being prevalent: Blu-ray beating out HD-DVD for recorded media and USB beating out Firewire for peripheral connections.

From a true, "*ex ante*" perspective, which occurs at a time before any of these complicating factors is revealed, each potential SSO participant has an interest in seeing optimal investment by all classes of participants and so wants the SSO to adopt rules that will prevent opportunistic behaviors (even their own). SSO participants are thus highly motivated to adopt rules that, from such a true "*ex ante*" perspective, are seen by all interests as creating a stable environment for adequate investment by and reward to all interests. To accomplish that end, the rules must facilitate coordination among SSO members while being attentive to the full range of transaction costs, including information costs, negotiating costs, and litigation costs.

If inventors and their commercialization partners reserve for themselves too large a share of the total rewards, potential licensees will be driven to look elsewhere to avoid high fees. If inventors and their commercialization partners get too small a share of the rewards, they won't be able to recoup their own investments in making and commercializing new technologies. The SSO membership is acutely aware of these fundamental tradeoffs and, therefore, has strong incentives to choose the most cost-effective measures to achieve the right balance. In selecting its patent disclosure and licensing rules, the SSO membership generally operates from behind a veil of ignorance—that is, they design their rules well before any downstream party makes *any* of its necessary investments in basic R&D relevant to a particular standards project, before product development, before supporting infrastructure, before marketing, and, indeed, before all of the other ancillary SSO activities. This approach represents a true "*ex ante*" time frame.

SSOs relentlessly seek to maximize the likelihood that their commercial standards will gain market acceptance, such that each "interest group" within the SSO is able to earn an attractive return on its subsequent investments, both in producing its own inventions and in using the inventions of others. Those SSOs that adopt better approaches for mitigating these myriad problems are more likely to succeed than their rivals. Through this competitive process, it should not be surprising to see a host of surviving SSOs today whose rules have a record of successfully meeting, in a wide variety of distinctive technological settings, the needs of *all* classes of participants—manufacturers/licensees as well as innovators/licensors.

The success on the ground bears out the theoretical insight that hold-ups are not a serious threat to collaboration over and around standards. SSOs are not some new-fangled institution that has burst onto the scene in recent years.[23] Virtually any industry that requires the interconnection of disparate

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[23] Strictly speaking, SSOs themselves are organizations rather than institutions, but we refer to them as institutions to encourage focus on the rules that govern them and the enforcement characteristics of those rules. *See* Douglass C. North, Nobel Prize Lecture, *available at* http ://www.nobel.se/economics/laureates/1993/north-lecture.html (explaining in more detail the relationship between institutions and organizations as terms of art in the field of New Institutional Economics).

products will use an SSO to reduce the transactions costs needed to bring together a diverse set of users and producers. Three such SSOs (or organizations of SSOs) recently submitted detailed comments to the FTC on its proposal.[24] Each of these reported that it has *never,* in the course of its work, observed a problem of hold-up of manufacturers by owners of patents essential to its standards.

An overarching trade association for SSOs in this country is the American National Standards Institute (ANSI), whose mission is "the creation, promulgation, and use of thousands of norms and guidelines that directly impact businesses in nearly every sector."[25] Founded in 1918, ANSI has oversight function over more narrowly focused SSOs, including those that operate in patent-intensive areas. For example, the Telecommunications Industry Association, which was first accredited by ANSI in 1988, has 70 standards committees staffed by over 1,000 volunteers, who have generated over 3,000 standards and papers. In its letter of June 21, 2011, ANSI opposes the FTC Proposal on the ground that it will place unnecessary obstacles in the path of successful standards adoptions.[26] The Alliance for Telecommunications Industry Solutions submitted its letter to the FTC with the same message, based on close to three decades of operation in the standards space.[27] The American Intellectual Property Law Association, many of whose members regularly deal with IP in the SSO setting, in its letter also dated June 14, 2011, similarly emphasized the importance of ensuring the government leaves market actors free to enter voluntary licensing and SSO relationships.[28] Yet, there is nothing in the FTC Report that reflects the historically successful practical experience of these SSOs and their participants, or those like them. Instead, the FTC prefers to rely on flawed academic critiques that

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[24] ALLIANCE FOR TELECOMM. INDUS. SOLUTIONS, COMMENTS ON P11-1204 at 1 (June 14, 2011) ["ATIS Comments"] ("ATIS has not experienced the hold up problem"); INT'L COMM. FOR INFO. TECH. STANDARDS, COMMENTS ON P11-1204 at 1 (June 20, 2011) ("The current officers and staff have not been notified of any active patent 'hold-up' problems with regards to INCITS standards."); TELECOMMS. INDUS. ASSOC., COMMENTS ON P11-1204 at 4 (June 14, 2011) ("TIA has never received any complaints regarding such 'patent hold-up' and does not agree that 'patent holdup' is plaguing the information and telecommunications technology (ICT) standard development processes.").

[25] *About ANSI Overview,* AM. NAT'L STANDARDS INST., http://www.ansi.org/about_ansi/overview/overview.aspx?menuid=1 (last visited Aug. 1, 2011).

[26] Comments of AM. NAT'L STANDARDS INST. ("ANSI"), FTC, THE EVOLVING IP MARKETPLACE: ALIGNING PATENT NOTICE and REMEDIES WITH COMPETITION (June 21, 2011), at 5 ("There may be adverse consequences if an unintentional failure to disclose an essential patent precludes an SDO participant from asserting its intellectual property rights against implementers of the standard and from seeking RAND royalties and terms.").

[27] ATIS Comments, *supra* note 24, at 1–2.

[28] Am. Intellectual Property Ass'n, COMMENTS ON P11-1204 at 2 (June 14, 2011) ("To best encourage invention and competition, IPR owners *and* users–i.e., licensees–of IPR-protected technology must remain free to negotiate all the terms of their licenses to strike the right balance for their particular circumstances.")

place undue focus on a theoretical problem of "patent thickets" rather than giving attention to real-world reports from the SSOs themselves, which deny the occurrence of patent thickets.[29]

C. The FTC Proposal Would Create SSOs that Do Not Work for Inventors or Manufacturers

The FTC Report does not offer any quantitative estimate of value-destroying breakdowns on the present system, nor does it offer any empirical basis to conclude that such breakdowns are of a frequency and magnitude that could justify radical change to a system that has enabled numerous successfully implemented standards. As a result, it is highly unfortunate that the FTC Proposal would tilt the balance against innovators and in favor of technology adopters by substituting new rules governing royalties for patent use and remedies for patent infringement—rules set by academic theory rather than set by consensus of actual industry participants (as are existing SSO rules) or by statute and common-law evolution guided by a multitude

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[29] *See, e.g.*, Carl Shapiro, *Navigating the Patent Thicket: Cross Licenses, Patent Pools, and Standard Setting*, *in* 1 INNOVATION POLICY AND THE ECONOMY 119 (Adam B. Jaffe, Josh Lerner & Scott Stern eds., MIT Press 2001); Mark A. Lemley & Carl Shapiro, *Patent Holdup and Royalty Stacking*, 85 TEX. L. REV. 1991 (2007). Although the FTC and some scholars are concerned about unlikely opportunism problems relating to potential patent thickets, patent gridlock, and patent anticommons, the more likely problems are those the literatures in law and economics and new institutional social science associate with the labels "government-created permit thickets" and "license Raj." *See* Richard A. Epstein, *Heller's Gridlock Economy in Perspective: Why There is Too Little, Not Too Much Private Property*, 53 ARIZ. L. REV. 51 (2010) (critiquing MICHAEL HELLER, THE GRIDLOCK ECONOMY: HOW TOO MUCH OWNERSHIP WRECKS MARKETS, STOPS INNOVATION, AND COSTS LIVES (2008)). *See also* F. Scott Kieff, *On Coordinating Transactions in Intellectual Property: A Response to Smith's Delineating Entitlements in Information*, 117 YALE L.J. POCKET PART 101, 106-09 (2007) (building on Richard. A. Epstein, *The Permit Power Meets the Constitution*, 81 IOWA L. REV. 407 (1995) (discussing "permit thickets"); Sunita Parikh & Barry R. Weingast, *A Comparative Theory of Federalism: India*, 83 VA. L. REV. 1593, 1608 (1997) (discussing "license Raj"); and Richard A. Epstein & Bruce N. Kuhlik, *Navigating the Anticommons for Pharmaceutical Patents: Steady the Course on Hatch-Waxman* 4 (Univ. of Chicago Law Sch. John M. Olin Program in Law & Econ., Working Paper No. 209, 2004), *available at* http://ssrn.com/abstract=536322, and critiquing Michael A. Heller, *The Boundaries of Private Property*, 108 YALE L.J. 1163, 1174–75 (1999) and Michael A. Heller & Rebecca S. Eisenberg, *Can Patents Deter Innovation? The Anticommons in Biomedical Research*, 280 SCI. 698, 700 (1998)).

The FTC is also overly skeptical about the role played by so-called "patent trolls," which it refers to as "Patent Assertion Entities" (PAEs). FTC REPORT, *supra* note 7, at 50, 60-72. Although litigation tactics that are purely harassing should be condemned regardless of who employs them, critics of PAEs that that assert meritorious cases should also be mindful of the economics literature on the roles of firms as market intermediaries and the contribution of market intermediaries to transaction efficiencies. *See, e.g.*, DANIEL F. SPULBER, THE THEORY OF THE FIRM: MICROECONOMICS WITH ENDOGENOUS ENTREPRENEURS, FIRMS, MARKETS, AND ORGANIZATIONS (2009); DANIEL F. SPULBER, MARKET MICROSTRUCTURE: INTERMEDIARIES AND THE THEORY OF THE FIRM (1999).

of real-world fact situations (as are existing rules governing damages and in-junctive relief). The FTC's nearsighted approach would remove incentives for invention and discourage private coordination needed to bring inventions to market, including the establishment of industry standards.

Moreover, the FTC Proposal could not work in practice. The terms that bring parties together today are so materially and advantageously different from those that the FTC Proposal envisions that it is hard to see how these two disparate regimes could coexist. Under the framework long enjoyed by industry participants before the FTC Report, at the time that standards are being propounded, it is in the interest of no party to plant the seeds for a de-structive hold-up problem down the road, and the parties have and rely upon private means of preemptively avoiding the risk of later hold-up. The FTC Proposal, which privileges downstream users in a manner around which the parties cannot contract, increases the likelihood that these same downstream users will exert hold-up pressures that expropriate the patented technologies of upstream inventors and their commercial partners in ways that could easily impede the advent of new technologies.

None of this new-found uncertainty is needed. Within and through SSOs, industry participants routinely enter into complex agreements regarding compatibility and technology interoperability. These agreements operate much like mini-constitutions in that they are usually implemented through SSO rules and are thereby multilateral, not merely bilateral, and bind all members of the SSO. If the FTC were to establish its own rigid rules to displace this existing voluntary, consensus-based regime, the affected parties may face difficult choices about whether to invest in a technology today given the host of potential risks tomorrow. The approaches that SSOs use today set the crucial stage that allows private parties to negotiate, when appropriate, bilateral transactions, during which specific prices are set. In this way, SSOs also facilitate bilateral interaction. But, the more certain that technology adopters are, *ex ante*, that courts will give them favorable licenses *ex post*, the more this changed rulebook will induce downstream parties to act strategically by pulling out of the SSOs that have fostered long-term stability for all parties, both upstream and downstream in the production chain. If the FTC goes further, it will arrogate, first to the courts and thereafter indirectly to itself, the role of effective rate-setter. Judicial damage awards or extensive antitrust enforcement actions would provide an easy point of entry for large firms with political clout to engage in rent-seeking behavior so well documented in the public choice literature.[30]

Technology inventors and adopters all understand there are risks associated with the selection of a standard. This type of risk, however, is not

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[30] Stephen Haber, F. Scott Kieff & Troy A. Paredes, *On the Importance to Economic Success of Property Rights in Finance and Innovation*, 26 WASH. U. J.L. & POL'Y 215, 236-40 (2008) (providing a general review of institutional details that can make property rights operate "at their best" or "at their worst").

materially different from ordinary business risk that most industry partici-
pants can well manage—including possible failure in the marketplace.
However, most technology firms cannot bear the risk that the government
will place an upper bound on the return to their successful patented tech-
nologies that systematically disregards the risks of getting that technology
established in the first place. Yet, that is exactly what the FTC Proposal
would accomplish.

Thus, the FTC Proposal would coerce SSOs to operate under rules that
informed and rational industry participants would never select for them-
selves because they would frustrate rather than facilitate effective coordin-
ation among all involved. In contrast, current SSO practices ensure that
winning technologies receive rewards that are sufficient to attract inventors
as well as their commercialization partners (including manufacturers) to the
marketplace in the next innovation cycle.

III. THE SUFFICIENCY OF EXISTING PRIVATE ORDERING SOLUTIONS TO MITIGATE HOLD-UP RISK, INCLUDING LICENSES, REPUTATION THROUGH REPEAT PLAY, AND RAND COMMITMENTS

In this Part, we explore in more depth the mechanisms underlying several of
the key tools that are used successfully in the IP marketplace to significantly
mitigate hold-up risk. We begin with the core definitional point: "hold-up"
is a term of art in the economic literature that is well understood by sophisti-
cated participants in the IP marketplace. Because no reasonable party in the
patent marketplace is surprised to face large numbers of patents, or new
patents constantly arriving on the scene, these private parties have long suc-
cessfully employed these and other private ordering solutions to sufficiently
mitigate hold-up risk rather than looking to the government to impose new
rules on the marketplace for regulating the use of these patents. We discuss
several particular examples of these ordering solutions: negotiating licenses
ex ante, relying on reputation effects in a repeat-play setting, and commit-
ments to license patents on RAND terms. We then point out that these
private ordering solutions should be expected to work much better than the
government approach that the FTC seeks to impose, because private parties
have significant informational advantages over government actors at the
FTC and in the courts. We conclude the discussion in this Part by showing
some ways in which the FTC is trying too hard to find problems with well-
functioning private ordering solutions in the IP marketplace.

A. Regular Direct Interaction Among Participants in the IP Marketplace as a Solution to "Hold-Up" Problems

The term "hold-up" has a very precise definition in the economic literature,
and it is important to first set that definition within its broader theoretical

context.[31] The concept of "hold-up" has been extensively elaborated on in work by the Nobel Prize-winning economist Oliver Williamson, who also referred to it as "opportunism," which he defines a "self-interest seeking with guile."[32] The presence of the term "guile" in this definition is key, and contemplates both that the perpetrator of the behavior acts badly and that the victim is unaware.

Joseph Farrell, John Hayes, Carl Shapiro, and Theresa Sullivan define the term differently, omitting the requirement of "guile":

> In very broad terms, opportunism or hold-up arises when a gap between economic commitments and subsequent commercial negotiations enables one party to capture part of the fruits of another's investment, broadly construed. Hold-up can arise, in particular, when one party makes investments specific to a relationship before all the terms and conditions of the relationship are agreed. Hold-up generally leads to economic inefficiency that contracting parties, and courts interpreting contracts, often try to avoid.[33]

But even this definition of the term does not extend to situations that merely enable the first party to retain a greater proportion of the fruits of its *own* investments. Nor does it include in the class of "hold-ups" every instance in which the second party fails to fully recover all investments that it may make that are specific to the relationship. Not all investments succeed in creating value, so it is customary for the second party to reasonably assume some risks that some of its specific investments will be lost. It would be strange and counterproductive to adopt a definition and rule against hold-up that makes the first party supply complete insurance for all risks born by the second party. That coercive redistribution of risk would unduly saddle inventors with even ordinary business risks within the control of manufacturers, as well as raise a host of moral hazard problems.

Yet even though the FTC repeatedly cites to Farrell, Hayes, Shapiro, and Sullivan,[34] it actually conducts its analysis and argument based on a third definition of hold-up that does not require capturing the fruits of another's investment. Thus, the FTC Report provides this definition of "hold-up":

> [If switching costs result in a] reasonable royalty . . . higher than it would have been at the time of the design choice, [then this is] "hold-up" [that] overcompensates patentees

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[31] Regrettably, some confusion surrounding the term "hold-up" may be caused by the extensive citation in the economic literature to a purportedly canonical example that has been proven factually incorrect. *See*, Ronald Coase, *The Conduct of Economics: The Example of Fisher Body and General Motors*, 15 J. ECON. & MGMT. STRATEGY 255 (2006) (citing Ramon Casadesus-Masanell & Daniel F. Spulber, *The Fable of Fisher Body*, 43 J.L. & ECON. 67 (2000)).

[32] *See, e.g.*, OLIVER WILLIAMSON, THE ECONOMIC INSTITUTIONS OF CAPITALISM: FIRMS, MARKETS, RELATIONAL CONTRACTING 61-63 (1985). A recent survey finds 900 empirical articles citing to this work, and the number is growing (http://www.bepress.com/bap/vol10/iss1/art1/). The theoretical literature is probably even larger.

[33] Joseph Farrell, John Hayes, Carl Shapiro & Theresa Sullivan, *Standard Setting, Patents, and Hold-up*, 74 ANTITRUST L.J. 603, 603-04 (2007).

[34] *See* FTC REPORT, *supra* note 7, at 139, 191-92, 227, 234.

compared to the economic value of the invention.[35] "Hold-up" is used throughout this report to describe a patentee's ability to extract a higher license fee after an accused infringer has sunk costs into implementing the patented technology than the patentee could have obtained at the time of design decisions.[36]

This peculiar FTC definition of hold-up is not only very different from the definitions offered by Williamson and by Farrell *et al.*, it is also so arbitrary as to be not useful. The major reason why the hold-up problem typically is solved is that the two parties have already dealt with each other prior to its possible occurrence. In contrast, the *holdout* problem is one that arises between strangers who have had no course of dealing with each other. Thus, suppose someone wants to build a new factory on the top of a hill, whose only connection to a key railroad is over a neighbor's plot of scrubland.[37] At this point, the factory owner would only commit to build that structure if it first obtained all necessary easements over the scrubland to prevent any holdout problem down the road. In this case, moreover, the potential factory owner would be prepared to play off one potential site against another to drive down the price of the needed easements. Indeed, in most settings, the scenario plays out the other way because landowners who seek to encourage the location of new factories often present potential factory owners in advance with a packet of easements and related benefits that negate the holdout problem before it starts.

The situation is the same with IP rights because the advance knowledge of a potential holdout risk leads parties to negotiate mutually acceptable solutions prior to its occurrence. The success of those negotiations is aided by the set of tools that patent law has developed to mitigate holdout risks, such as the disclosure requirements for issuance of a valid patent on the front end, and well-chosen rules regarding remedies after patent infringement on the back end.[38] In addition, in the context of standardized technologies, some SSOs provide an additional early source of information about potentially needed licenses in the form of requirements for public disclosure of potentially essential patents.

B. The Effectiveness of Bilateral Licensing

Manufacturers can, and do, engage in bilateral patent licensing before seriously investing in patented technology, both in settings in which SSOs are

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[35] *Id.* at 22.

[36] *Id.* at 191 n.61.

[37] *See* Strickley v. Highland Boy Gold Mining Co., 200 U.S. 527 (1906). *See also* Clark v. Nash, 198 U.S. 361 (1905), where a taking was allowed for irrigation ditch that was "absolutely necessary" to service a plot of land that was otherwise arid and valueless. The use of eminent domain eliminates the holdout problem, but the requirement of just compensation for the value of the property taken guards against the risk of expropriation.

[38] *See infra* Part IV.

deployed and those in which they are not. For example, in its recent submission to the FTC surrounding the present hearings, Qualcomm reported that it regularly grants licenses prior to the adoption of a standard and has never encountered a case in which a patent holder has refused a request to negotiate a pre-standardization license.[39] In a variation on this theme, patentees like Qualcomm have demonstrated a track record of reaching deals with licensees over existing technologies that also embrace future technology standards.[40] These contractual arrangements for future technologies go a long way towards mitigating potential risk of hold-up, and the licensor's willingness to enter into such open-ended licenses covering future standards gives some indication that the patent holder preferred the licensing option to preserving some potential opportunity to hold up the manufacturer at some future date.

Additionally, in the large majority of cases, there will be no difficulty in identifying—even prior to the adoption of a standard—the counterparties from which a manufacturer will need a license. Because most licensing relating to complex technologies is conducted on a portfolio basis, only a small number of players need to be contacted to reach the lion's share of the relevant pool of patents. Although manufacturers may not know instantly precisely which patents are available for licensing, keeping patent portfolios hidden from potential revenue-producing users is a losing game for any patent holder. Patents are wasting assets that cost their owners a great deal to enforce during their effective term. Accordingly, these patentees have powerful incentives to make their patent portfolios easily known to technology adopters, both large and small. In addition, many SSOs directly address the potential infringer's informational problem by adopting rules that affirmatively require members to publicly identify patents that are or may be essential to standards under development. Thus, especially in those areas of technology that are the focus of the FTC Report's concern with SSO hold-ups, the proper licensor for most patents in a given field can readily be found.

With all that said, although some manufacturers do move to obtain licenses before making serious investments in the patented technology, evidently some do not, even for those patents covering technologies they expect to become necessary. Yet, it is hard to see why a change in the rules is either necessary or prudent to protect these "late movers."

In fact, those who do not negotiate a license *ex ante* can generally be divided into four sub-categories. Not one of these categories is in the kind

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[39] QUALCOMM, INC., COMMENTS ON P11-1204 at 8 (June 13, 2011) ("Qualcomm has not encountered a situation in which 'late' identification of particular essential patent claims (or applications) by an SSO member that has given a categorical RAND commitment has altered the price of, or negotiating dynamic for, a license.").

[40] *See infra* Appendix, which sets forth a set of representative excerpts from existing Qualcomm license agreements that relate to future technology standards.

of desperate straits that would properly justify the forcible interventions outlined in the FTC's Proposal.

The first group comprises those parties who did not anticipate needing the patented technology and turn out to be correct. For these, no hold-up can occur.

The second group comprises those parties who did not anticipate needing the patented technology and who turn out to be wrong, so any hold-up potential is caused by their own failure to plan correctly. The FTC Proposal would eliminate the incentives that the current practices supply to all manufacturers to engage in careful planning so as to obtain needed rights.

The third group includes manufacturers who anticipate that they may need a license, but conclude based on experience with industry practices that they will not in fact be exposed to a "hold-up" risk. These parties thus conclude that they will not be unduly disadvantaged if they wait to negotiate a license until a later time. Accordingly, they rationally decide to postpone devoting resources to that licensing process until their need for a license is certain. The very existence of this group is a striking evidence of how the FTC vastly overestimates the hold-up problem that drives its entire agenda in this area.

The fourth group comprises those who are good at planning, but who direct their planning based on the prospects of getting a government actor like the FTC to intervene on their behalf, presumably with an eye towards obtaining better terms than those available through a voluntary *ex ante* negotiation.

In summary, FTC Report wrongly suggests that market failures such as imperfect information and differing valuations are the only two reasons why parties fail to strike efficient patent licensing deals up front.[41] But, sometimes it is efficient for a deal to *not* get done. Sometimes the technology will not be used. On other occasions the infringer is so inefficient that it cannot afford to pay the market rate. Furthermore, the knowledge that infringement may offer the downstream user its lowest-cost option under the FTC's proposed damage rules would significantly increase incentives for all future manufacturers to become part of this ever-expanding fourth group, which focuses on currying government favor rather than entering licensing agreements. The situation will only get worse if courts refuse to issue patentees injunctions against infringing conduct under *eBay v. MercExchange*,[42] a prospect that we do not discuss in this article.[43]

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[41] FTC REPORT, *supra* note 7, at 170–71.

[42] eBay, Inc. v. MercExchange, LLC, 547 U.S. 388 (2006).

[43] The traditional equitable analysis within the test for injunctions wisely asked only whether someone otherwise entitled to an injunction should not get one, in the judge's discretion, in light of a hardship on the defendant that could be shown to be grossly disproportionate. *See* Richard A. Epstein, *A Clear View of The Cathedral*: *The Dominance of Property Rules*, 106 YALE L.J. 2091, 2102 (1997); Herbert F. Schwartz, *Injunctive Relief in Patent Infringement Suits*, 22 U. PA. L. REV. 1025, 1045-46 (1964); 42 AM. JUR. 2d *Injunctions*, § 35 (2005).

C. Restraining Opportunism with Reputation and Repeat Play

One reason why "late movers" in the third group, mentioned above, are willing to do business without an *ex ante* license is that they calculate the risk of hold-up to be low precisely because technology adoption is an almost end-lessly repeated game. In the case of cellular phone technology, the 3G stand-ard was technically developed while 2G royalties were being negotiated or paid; and 4G is now being developed while 3G licenses are being negotiated or paid. In other words, industry participants do at least three activities simul-taneously. They cooperate with each other (or not) in SSO technology com-mittees to develop the next standard; they negotiate the next license; and they pay royalties under the last license. Any participant perceived as behaving "badly" in the licensing context is likely to find few allies and face many diffi-culties when it seeks to promote its new technologies for inclusion in future standards. In this highly interlaced world, across players and across time, reputational constraints cut deeply. Furthermore, because the same major players show up repeatedly in many different settings, the power of reputation exerts a significant multiplier effect that restrains patentees from acting oppor-tunistically. Qualcomm, for example, is a member of over 80 SSOs.[44] If a patent-rich party were to behave "badly" in one context, it will quickly pay a reputational price in unrelated standards markets. This powerful multiplier effect constrains all but the peripheral set of one-shot players.

D. RAND Commitments and the Private Market

In addition to direct, bilateral licenses, groups of market participants also make widespread use of SSO rules applicable to all member parties. In these settings, patentees agree in advance to commit to offering licenses on RAND terms as a condition of including a patented technology in the standard.[45] Such RAND commitments give potential adopters of a technology the assurance of knowing that the patented technology necessary to implement the standard will at least be available for licensing on terms that will not strongly disadvantage them as compared to their similarly situated competitors. In this sense, SSOs have already adopted by private agreement a flexible but important set of limitations on pricing that responds to market incentives, not government dictates.

It is true that SSO rules consistently fail to define "RAND" according to any precise formula. But, because this is the consensus result of the com-petitive evolution of SSO rules that we discussed earlier, it is appropriate to take as a first hypothesis that this flexibility in the concept of RAND is a strength, not a weakness. One size rarely fits all, and the use of RAND

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[44] QUALCOMM, INC., *supra* note 39, at 2.

[45] *See* Mark A. Lemley, *Intellectual Property Rights and Standard-Setting Organizations*, 90 CAL. L. REV. 1889 (2002) (showing that SSOs often adopt RAND agreements).

terms does not obligate each patentee or SSO to ensure that every licensee receives identical terms.

There are many reasons why identical terms will not be appropriate in all cases. In some instances, some licensees are in a position to supply cross-licenses of varying value to the licensor. In other instances, licensees are in a position to engage in some other form of valuable commercial cooperation. One type of cooperation commonly explored involves a commitment to make market-expanding investments. Another involves a commitment to engage in risk-sharing with the licensor through an up-front payment. Yet another involves a commitment to return valuable information to the patentee. Each of these forms of value may be balanced by a lower cash license fee or royalty rate.

In addition, some licensees may well sign on sooner when the technology is riskier and the value of the license less certain (for example, before a standard is developed). These early sign ups provide valuable market valid-ation as well as early liquidity for the innovator. In return, they may receive a lower nominal price, just as those individuals who purchase condominiums when they are first put on the market often receive lower prices than buyers who purchase at the end of the sales cycle. In other cases, it may well be that the precise terms for use may vary significantly depending on the par-ticular uses to which the new standard is put.[46] These examples are just some of the main reasons why maintaining flexibility around a RAND com-mitment is hugely beneficial for both patentees and manufacturers, and ul-timately for consumers.

At the same time, the flexibility of a RAND commitment does not mean that it is meaningless. RAND has been the subject of legal assertion, both offensive (in *Nokia v. Qualcomm*) and defensive (in *Nokia v. Apple*).[47]

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[46] There is wide consensus that RAND does not, and should not, mean "the same terms for everyone," but instead means something closer to "similarly situated licensees are entitled to similar terms," at most. *See* Roger G. Brooks & Damien Geradin, *Taking Contracts Seriously: The Meaning of the Voluntary Commitment to License Essential Patents on "Fair and Reasonable" Terms* 19 (Working Paper, Mar. 12, 2010), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1569498. Some considerable flexibility in terms (including rates) is industry standard. On the other hand, we suspect that substantial (for example, 2-fold) price discrimination merely to take maximum advantage of the higher demand of some licensees, without some additional counterbalancing value flowing to the licensor, would be widely considered inconsistent with a RAND commitment. To use the language of general public utility regulation, cost-based price discrimination is needed to encourage efficient utilization. Demand-based price discrimination is more difficult to evaluate. On the one hand, it allows for rent extraction. On the other hand, the higher rates charged to higher demanders may soak up a larger fraction of fixed costs which allow lower demanders to participate in the market. We do not address these complications here. Certainly we do not want to suggest a belief that there is complete freedom to price discriminate in the face of a RAND commitment.

[47] For example, Nokia and Qualcomm had a huge and intense litigation over RAND in 2007-08 that settled the morning of trial. Both of those parties had large cellular patent portfolios that made sense to cross-license, which they are reported to have accomplished through a lengthy agreement. According to public reports, the settlement also included a

Although these complex cases settled before court decisions were reached—the common result in commercial disputes between sophisticated industry participants with wide ranges of business relationships and potential relationships—the mere risk of adjudication is sufficient for RAND to influence negotiations of license terms.

Private SSOs thus maintain for all players the flexibility to strike deals capable of accommodating a wide range of business models (for example, both vertically integrated and non-integrated organizations), a host of private objectives (for example, short-term and long-term planning horizons, low- and high-risk tolerance), and a variety of production technologies and operating costs. They also hold open the prospect of recontracting down the road if the initial set of terms no longer works for the mutual advantage of all parties.

E. Addressing the Risk of Reverse Hold-Up with SSO Rules

Unlike the FTC Proposal, existing SSO rules also mitigate the risk that manufacturers may use the standardization process to hold up innovators who have already "sunk" their R&D costs by demanding from innovators low royalty terms as a condition for supporting inclusion of particular technology in a standard. In fact, some major SSOs have rules that *prohibit* the discussion of licensing terms within technical standardization deliberations and that require standardization decisions to be made based on technical considerations.[48] This is not to say that participants may not be biased

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sale of a large patent portfolio from Nokia to Qualcomm, and cleared the way for the parties to enter into other mutually advantageous, complex, and ongoing business relationships. *See, e.g.*, Press Release, Nokia, Nokia and Qualcomm Plan to Develop Advanced Mobile Devices (Feb. 17, 2009), *available at* http://press.nokia.com/2009/02/17/nokia-and-qualcomm-plan-to-develop-advanced-mobile-devices/; Press Release, Qualcomm Inc., Nokia and Qualcomm Plan to Develop Advanced Mobile Devices (Feb. 17, 2009), *available at* http://www.qualcomm.com/media/releases/2009/02/17/nokia-and-qualcomm-plan-develop-advanced-mobile-devices; Paul Taylor, *Nokia and Qualcomm to Develop New 3G Handsets*, FT.COM, Feb. 17, 2009; W. David Gardner, *Nokia, Qualcomm Team up to Deliver Symbian Devices*, INFORMATIONWEEK, Feb. 17, 2009; Elizabeth Woyke, *Nokia And Qualcomm: Happy Together*, FORBES.COM, Apr. 21, 2009; *Nokia picks Qualcomm for Windows phone, Seeks Others*, REUTERS, May 20, 2011. Such success in striking a deal to resolve even a highly heated dispute reveals a great deal about the relative power of private ordering constraints including the recognition by both parties that they each benefit from smooth repeat interactions since they "live in the same neighborhood" compared to the power of factors that are the focus of the behavioral economics literature, such as irrational cognitive bias and animosity. If the real-world relative impact of these factors had cut the other way, then Nokia and Qualcomm would not have been successful in moving very quickly from all-out war to identifying and seizing joint business opportunities.

48   *See, e.g.*, ETSI, ETSI GUIDE ON INTELLECTUAL PROPERTY RIGHTS (IPRs) §§ 2.3, 4.1 (Nov. 27, 2008), *available at* http://www.etsi.org/WebSite/document/Legal/ETSI_Guide_on_IPRs.pdf (last visited Aug. 1, 2011); AM. NAT'L STANDARDS INST., GUIDELINES FOR

against inclusion of technology belonging to "bad actors," as discussed above. The system does, however, appear to prevent anything like an "auction for inclusion," which could facilitate hold-up of innovators by manufacturers after the innovators have made large investments in their technology development.

Both innovators and manufacturers receive another layer of protection within the voluntary SSO system in that the SSO process (unlike the FTC's proposed mandates) is not exclusionary. Any industry participants that do not like the balance struck by a given set of SSO rules are free to advocate that the SSO change its rules or to start a competing SSO working under different rules. The extent to which a significant number of SSOs, with stable rules, persist over time suggests that those rules and SSOs generally strike a balance that is acceptable to market participants. At the same time, the extent to which new rules are adopted and new SSOs are formed similarly suggests that market participants are able to implement superior alternatives when established patterns no longer serve their interests well.

F. The Significant Informational Advantages of Private Parties over Governmental Actors

The frequent use of this powerful toolkit of private arrangements is hard to reconcile with the FTC's premise that SSO participants make systematic licensing arrangement errors that disadvantage manufacturers in ways that require forcible intervention and correction by non-participant courts or regulators. Even granting that the current balance of rights, incentives, and remedies will not produce perfectly efficient results (no process can), courts and regulators certainly lack the expertise and detailed technological knowledge, let alone the resources and time, to intervene and control the extensive private negotiations occurring at the technological frontier. Governments have proven repeatedly that they lack the expertise and skill to pick and appropriately price technology winners. Only private industry can form the web of relationships necessary to conduct the difficult experiments needed to fund, develop, and test new products and manufacturing processes in the laboratory and in the marketplace. In light of the extraordinary delicacy involved in license negotiations over complex standards, regulators lack the knowledge and resources to replicate private negotiations in general. No one

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IMPLEMENTATION OF THE ANSI PATENT POLICY § III.B (Feb. 2011), *available at* http://
publicaa.ansi.org/sites/apdl/Documents/Standards%20Activities/American%20National%
20Standards/Procedures,%20Guides,%20and%20Forms/Guidelines%20for%
20Implementation%20of%20ANSI%20Patent%20Policy%202011.pdf (last visited Aug. 1,
2011); VITA STANDARDS ORG., VSO POLICIES AND PROCEDURES § 10.3.4, *available at* http://
www.vita.com/home/VSO/vso-pp-r2d6.pdf (last visited Aug. 1, 2011).

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can seriously imagine the government sensibly immersing itself in the details of every construction project. Yet, that is just what the FTC Proposal invites courts and competition enforcement agencies to do with regard to some of the most complex cooperative efforts and technologies in our modern economy.

G. The FTC's Overstatement of Problems with Private Ordering Solutions

The FTC appears to believe that private awareness of both holdout and hold-up risks in general does not motivate and enable these parties to adequately address these risks for patented technologies in particular, whether through SSO rules or bilateral negotiations. This view may stem from a belief that, because they are intangible, defined by mere words, patents fail to give notice of the boundaries of the property rights they create.[49] But patent rights are by no means unique in being "intangible," and parties routinely contract successfully regarding intangible rights. For example, many property rights in land are intangible, such as easements, yet market actors are able to contract over them and plan around them at reasonable cost without placing undue burdens on competition. Indeed, unlike property rights in land, which are ordinarily recorded at countless offices across the country using a range of standards for language and form, and governed by disparate state laws, patents are centrally filed and searchable online for free using consistent forms and a single body of case law about interpretation.

Unfortunately, the FTC's view ignores or dismisses the explicit requirement of the current patent law, which requires an extensive disclosure that publicly teaches and describes the claimed subject matter as a precondition for issuance of a valid patent. These disclosures reveal the best modes known to the inventor, and they are definite enough to give other inventors adequate notice about the boundaries of any given patented technology.[50] It is noteworthy that in each of the high-profile cases so often held up as examples of "holdout"—such as *RIM*, *eBay*, and *Microsoft v. i4i*[51]—the patents in those cases were judged by the courts to have satisfied every one of these disclosure requirements despite extremely well-funded litigation teams making

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[49] *See, e.g.*, JAMES BESSEN & MICHAEL J. MEURER, PATENT FAILURE: HOW JUDGES, BUREAUCRATS, AND LAWYERS PUT INNOVATORS AT RISK 29-72 (2008) (cited by the FTC Report, *supra* note 7 at 81 n. 46 in support of the claim that patents are difficult to interpret "across the board").

[50] 35 U.S.C. § 112, ¶¶ 1-2 (setting forth the disclosure requirements of patent law known as "enablement," "written description," "best mode," and "definiteness").

[51] NTP, Inc. v. Research in Motion, Ltd., 418 F.3d 1282 (Fed. Cir. 2005); eBay, Inc. v. MercExchange, LLC, 547 U.S. 388 (2006); Microsoft Corp. v. i4i Ltd. Partnership, 131 S.Ct. 2238 (2011).

every conceivable invalidity argument. Throughout Patent Office reexaminations, federal court trials, and federal court appeals, including to the Supreme Court in some of these cases, these patents were determined to give adequate notice. What is more, in *Microsoft v. i4i*, the patent was sufficiently clear that the infringement was found to have been willful.[52] One cannot willfully violate rights whose boundaries are not understood.

Further, at least with respect to the great bulk of patents essential to the type of technology-intensive standards that appear to concern the FTC most, the "notice" problem is a non-issue when it comes to licensing. Because the vast majority of patents essential to such standards are held in portfolios of known participants in the relevant industry and are licensed on a portfolio basis, manufacturers often know with near certainty which current patent holders to approach for licenses even if they do not know with precision what the boundaries are of every single patent within that large portfolio.

The FTC policy first tries too hard to contain the low risk of hold-up by licensors and then compounds its mistake by treating licensees as a class entirely populated by victims. The risks of this approach are illustrated by the long-running controversy over alleged exercise of hold-up power by Rambus over memory chip manufacturers in connection with its participation in an SSO.[53] Ultimately, the federal appellate courts rejected each theory of hold-up by Rambus as not supported by the facts.[54] That conclusion implies that the extensive costs of those proceedings—on both the government and the market—were spent for no good purpose. In fact, it was the government's other costs (spent proving that the complaining DRAM manufacturers, Hynix and Infineon, had themselves engaged in extensive pricing fixing) that were productive in catching behavior that was so bad that it generated criminal charges involving fines now totaling over half a billion dollars and jail sentences for several of the conspiring executives.[55]

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[52] i4i Ltd. Partnership v. Microsoft Corp., 598 F.3d 831, 858-60 (Fed. Cir. 2010); *aff'd sub nom* Microsoft Corp. v. i4i Ltd. Partnership, 131 S.Ct. 2238 (2011).

[53] The *Rambus* case involved four technologies that were patented by Rambus and that were included in a memory chip standard developed by an SSO of which Rambus was a member. Rambus left the SSO after it became apparent that the SSO's required licensing terms were not compatible with Rambus's intended terms. Litigation and an FTC complaint ensued. The administrative law judge dismissed the FTC complaint, but the Commission reversed, holding that Rambus willfully engaged in misrepresentations. The D.C. Circuit Court of Appeals set aside the Commission's orders. Rambus Inc. v. Fed. Trade Comm'n, 522 F.3d 456, 459-62 (D.C. Cir. 2008).

[54] *Id.* at 468 (holding that "the Commission failed to demonstrate that Rambus's conduct was exclusionary, and thus to establish its claim that Rambus unlawfully monopolized the relevant markets") (citing Rambus Inc. v. Infineon Technologies AG, 318 F.3d 1081, 1102 (Fed. Cir. 2003) (deciding that the patentee did not commit fraud or breach of contract)).

[55] *See, e.g.*, Press Release, U.S. Dept. of Justice, Samsung Agrees to Plead Guilty and to Pay $300 Million Criminal Fine for Role in Price Fixing Conspiracy (Oct. 13, 2005), *available at* http://www.justice.gov/opa/pr/2005/October/05_at_540.html (last visited Aug. 1, 2011):

IV. THE FTC's ILL-CONCEIVED AND INEFFICIENT PROPOSED CHANGES TO LONG-ESTABLISHED DAMAGES RULES

Our discussion in this Part details a number of ways in which the FTC Proposal would make important, but ill-advised, changes to the rules governing the damages that are imposed when parties infringe. As more fully detailed below, these prescriptions are systematically and seriously misguided for multiple reasons.

A. The FTC's Improper Approach to Damages Would Ensure That Infringers Pay No More Than Licensees

One of the central prescriptions of the FTC's Report is that courts should change their approach to calculating damages for patent infringement, both in general and with particular reference to infringement of patents subject to RAND commitments. Among other things, the FTC urges the following: "Courts should apply the hypothetical negotiation framework to determine reasonable royalty damages for a patent subject to a RAND commitment. Courts should cap the royalty at the incremental value of the patented technology over alternatives available at the time the standard was defined."[56]

Indeed, the FTC argues that the innovator in the pre-standardization hypothetical negotiation "would rationally want to license the patent at the maximum amount the infringer would pay" (as opposed to declining to license), and notes that this figure necessarily sets the upper bound on the royalty rates to which the parties would actually agree.[57] The FTC further points out that a reasonable royalty damage measure for patents subject to a RAND commitment is "the hypothetical negotiation amount" in a negotiation conducted "at the time of setting the standard," which presumably will be an amount lower than that upper bound.[58]

The combined effect of these prescriptions would be that the blithe infringer—the infringer who for any reason falls short of "willful"—is to pay

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Samsung Electronics Company Ltd. (Samsung), a Korean manufacturer of dynamic random access memory (DRAM) and its U.S. subsidiary, Samsung Semiconductor Inc., have agreed to plead guilty and to pay a $300 million fine for participating in an international conspiracy to fix prices in the DRAM market, the Department of Justice announced. Samsung's fine is the second largest criminal antitrust fine in U.S. history and the largest criminal fine since 1999....Including today's charge, three companies and five individuals have been charged and fines totaling more than $646 million have resulted from the Department's ongoing antitrust investigation into price fixing in the DRAM industry.

Id.

[56] FTC REPORT, *supra* note 7, at 194.
[57] *Id.* at 168, 168 n.37, 187.
[58] *Id.* at 168, 193.

no more, if identified, sued, and defeated, than he would have had to pay if he had in fact negotiated a license at the time the standard was set. The situation is difficult enough if the patentee is in a position to identify and pursue, often at great cost, the large number of infringers. But, these assumptions ignore the high costs in the detection and enforcement of these rights, especially if operating under FTC rules that artificially depress the expected returns from litigation. The inevitable slippage in the damage system, combined with the risks of error inherent in any system of litigation, would invite downstream manufacturers to adopt a strategy of willful ignorance under which they would steer clear of paying high damage awards while advancing their own businesses on the backs of technologies invented and paid for by others.

B. The Harmful Effects for Consumers of the FTC's Measure of Damages

The FTC approach to damages defines "reasonable" damages to be that price which would be calculated at a moment, which the FTC misleadingly labels as "*ex ante*," when the licensee presumably has maximum bargaining power over the innovator because the licensee has made no investment in the technology while the licensor has made considerable investment in developing the technology. The "reasonable" price suggested by the FTC does not reflect in any way the bargains that would be arrived at in the real marketplace, in which participants decide to negotiate licenses—and indeed to enter the market—at a wide variety of times, for a variety of reasons, and facing a variety of risks and opportunities. If the FTC's bargain prices were always available to infringers through the courts—or worse yet, were used as a standard to accuse negotiated license terms retroactively of being "unreasonable"—the result would be the destruction of private bargains and the generation of government-sponsored hold-up that would substantially reduce the returns to innovators and adopters alike.

The FTC Proposal does not serve the interests of consumers. It is precisely the reasonable expectation of supracompetitive profits that spurs both inventors and their contracting partners in commercialization to open up new technological fields and develop new markets. In these continually cutting-edge markets, the best way to constrain monopoly profits is not to transfer pricing to courts or enforcement agencies but to develop a legal regime whereby the rapid introduction of a second product in a given field offers some measure of competition to the earlier entrant. The FTC's below-market pricing systems make it all the more likely to postpone the next wave of innovation. A sound system of market returns depends on private coordination among inventors, technology adopters, and customers in ways that adjust flexibly to the distinct characteristics of a given technology and to continued technological change. Arbitrary regulatory pricing formulas

cannot hope to replicate such market agreements between inventors, adopters, and customers. Rather, their major impact would be to throw the utility and validity of these contractual arrangements into doubt.

C. Using Damages to Encourage Private Ordering Rather Than Infringement

The FTC's approach to damages sets the wrong goal. It is neither possible nor desirable to tailor and cap the measure of damages so that implementers are indifferent between infringement and taking a license. On the contrary, one of the key functions of a damage remedy is to induce rational actors to take the necessary steps to identify relevant patents and acquire voluntary licenses.

Compared to industry participants, courts and regulators are severely lacking in the information and resources necessary to value and structure transactions regarding complex innovation within rapidly evolving industries and will chronically do it badly, thereby introducing severe uncertainty and perverse incentives into the cycle of investment in R&D, product development, and marketing. The difficulties of setting ideal damage rules with patented technologies are far greater than they are for simple cases involving conversion of typical items of personal property. In virtually all contexts, research and development (R&D) is both a costly and a risky business plagued by an irreducible level of randomness. The outcomes of R&D are not known in advance. The uncertainty present in the process of scientific and technological discovery is one of the most significant attributes of inventive activity. There is no mechanical connection between investments and outcomes in R&D because of the uncertain nature of inventive activity.[59] Accordingly, technology prices cannot be accurately established through arbitrary price regulation as there is no well-defined "rate base" of the sort that can be put together (and, even then, only with difficulty) in public utility regulation.[60] Indeed, even in the traditionally regulated industries, price-setting through governmental mechanisms proved so unsuccessful and inflexible that deregulation of prices has generated manifest consumer benefits in such diverse industries as telecommunications and the Internet, wholesale and retail electric power, natural gas, trucking, railroads, and airlines. Against this record, to steer the pricing of a substantially increased proportion of intellectual property into the hands of courts by redefining infringement damage awards is not an acceptable policy.

Private ordering solutions create value that courts or regulators cannot. Patent license contracts related to industry standards are often complex

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[59] *See* FRANK KNIGHT, RISK, UNCERTAINTY, AND PROFIT 20 (1921) ("It will appear that a measurable uncertainty, or 'risk' proper, as we shall use the term, is so far different from an unmeasurable one that it is not in effect an uncertainty at all.").

[60] For a summary of the difficulties, see Duquesne Light Co. v. Barasch, 488 U.S. 299 (1989).

because they reflect the benefits of cooperation between the parties and contain elaborate value protection mechanisms. For that reason, these patent contracts usually take many pages of single-spaced text. If they were merely focused on the dollars payable in the event of breach, they could be completed in a single sentence that contains the patent number and a damage schedule that assigns a dollar amount to each level of infringement. But court and agency options for regulating value are essentially limited to just that type of narrow tool kit—the single damages award. In addition, a negotiated license will provide predictability at an earlier stage than will litigation, thereby enabling the parties to seek investment, set up firms, formulate strategic plans, generate jobs, and make routine business decisions in the knowledge that they can rely on the expectations created by the license. Neither courts nor regulators can discharge any of these tasks.

Litigation imposes large costs compared to those triggered by private contracting. The costs imposed on the court system are obvious, and it is not apparent why taxpayers should subsidize the cost of allocation of intellectual property rights between businesses. Litigation, rather than voluntary contracting, also imposes large costs on the patent owner—some obvious and some less so. As is well known, the direct costs of patent litigation are commonly very large. Less visible costs, including the consumption of management attention, the unavailability of revenues until the conclusion of the litigation, the uncertainty of outcome inherent in litigation, and resulting customer reluctance to commit to product offerings, may, in fact, impose equal or greater burdens. Likewise, all downstream manufacturers are likely to suffer many of these categories of costs. Private contracting prior to infringement avoids all of them at the far lower business cost of identifying potential licenses and contracting over them.

This catalogue of difficulties in litigation does not deny that courts will have to do the best they can in order to estimate damages in a routine patent infringement case today; of course they must. But, it is to say that the overall incentive structure should motivate implementers to identify, negotiate, and take needed licenses in a timely fashion rather than to engage in widespread infringement, which allows implementers to use patent adjudication to set their resulting obligations to the patent owner. For these reasons and others discussed further below, the FTC is deeply mistaken in suggesting that the damages for infringement should be set at the efficient price that would be struck at an earlier time in a voluntary contract that was not, in fact, entered into. On the contrary, the appropriate price for a privately negotiated contract is, from the perspective of overall social welfare, *not* the appropriate price for a damages award after litigation because the price in a litigation setting should include the litigation and other costs imposed on the patentee by the failure of the infringer to either get a license or design around the patented technology.

D. The Effectiveness of Damages Approaches That Encourage Private Ordering

More generally, the purpose of any damage rule for commercial contracts is not solely to provide the injured party with the same payment that it would have received had there been no breach. That measure is inadequate even in the simple situation when the buyer covers in the market for a standardized good after the seller's breach. In those cases, the contract/market differential does not represent the appropriate damage level, because it ignores the costs needed to acquire the cover.[61] The "what you would have been paid" measure is all the more inadequate in markets for non-fungible technologies, where infringement imposes a complex web of costs and destroyed value. For this reason, one of the functions of the correct damage rule is to reduce the frequency of infringements in the first place, so as to minimize the administrative costs of the system. An analog to willful patent infringement is the conscious decision of one landowner to cut the timber that he knows is owned by his neighbor. In these cases, the standard measure of damage is not the value of the timber to the owner less the cost he saves because the trespasser has cut the timber. Rather, it is the full value of the timber, without any offset to the defendant for the value of the labor added. The reason for this conscious overestimation in damages is to make it clear to willful converters that they are always *worse off* from their actions than they would have been if they had entered into voluntary transactions with the property owner.[62] The damage rule thus guides would-be converters into voluntary transactions so as to reduce the number of occasions where damages have to be calculated in the first place. The treble damages rule for willful patent infringement follows the same logic and helps achieve the underlying policy goal of strongly motivating voluntary contracting in preference to unilateral expropriation.

Thus, the traditional perspective of the law of patent damages—that damages awards should ensure that patentees are no worse off in cases of

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[61] For the appropriate rules, see U.C.C. § 2-712 (2003) ("Cover"; Buyer's Procurement of Substitute Goods):

> (1)After a breach within the preceding section the buyer may "cover" by making in good faith and without unreasonable delay any reasonable purchase of or contract to purchase goods in substitution for those due from the seller.
> (2)The buyer may recover from the seller as damages the difference between the cost of cover and the contract price together with any incidental or consequential damages as hereinafter defined (Section 2-715), but less expenses saved in consequence of the seller's breach.

The economic "cost of cover" may also include loss of value because identical cover is not available, as where the buyer of a long-term contract is forced to find its cover in a short-term market. *See*, *e.g.*, Mo. Furnace Co. v. Cochran, 8 F. 463 (W.D. Pa. 1881).

[62] *See* OLIVER WENDELL HOLMES, JR., THE COMMON LAW 97 (1881).

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infringement than they would have been had voluntary licensing occurred *ex ante*[63]—has it right. Timely private contracting can create value by ensuring that the patentee is made no worse off by the implementer's expropriation through infringement. Sensibly, the law puts the risk of value destruction from infringement on the infringer, which implies that infringement is likely to leave the infringer *worse off* than he would have been by taking a license. The FTC is, of course, correct as a matter of law that damages against non-willful infringers are "not meant to be punitive."[64] But damage rules in patent law that allocate these infringement costs on the doorstep of the infringer do not cause "punishment." Rather, they provide a rational allocation of risk that encourages those interested in using patented technologies to identify and contract with patentees *before* they put the patented technology to significant use. The correct government mission is more about guiding behaviors over time, in the dynamic sense, than it is about apportioning value between claimants at any given time. If potential patent infringers do not have incentives to do their homework and either get licenses to patented technologies or design around them, they will rationally elect to engage in uncoordinated infringement, destroying value in multiple corners of the IP marketplace. The bottom line is that the social goal of the patent system and its attendant damage rules is not to punish (let alone reward) infringers, but to guide them not to infringe.

E. Costs Imposed on Everyone in the IP Market by the FTC Approach

Although the FTC Report pays lip service to the necessity of deterring infringement,[65] an optimal damage rule should deter more infringements than those that are knowing and willful. The costs reviewed above all result from all unlicensed infringements, regardless of the defendant's mental state. Thus, it is critical to motivate manufacturers to *seek out* potentially relevant patents of which they are initially unaware, and to obtain licenses early in the process. Awarding treble damages and fees only to willful infringers cannot accomplish this important goal. Indeed, the willfulness rule can

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[63] As the Federal Circuit put it:

> A patentee is entitled to no less than a reasonable royalty on an infringer's sales for which the patentee has not established entitlement to lost profits. The royalty may be based upon... the supposed result of hypothetical negotiations between the plaintiff and defendant. The hypothetical negotiation requires the court to envision the terms of a licensing agreement reached as the result of a supposed meeting between the patentee and the infringer at the time infringement began.

Rite-Hite Corp. v. Kelley Co., Inc., 56 F.3d 1538, 1554 (Fed. Cir. 1995).

[64] FTC REPORT, *supra* note 7, at 20.

[65] *Id.* at 174.

create the perverse incentive of inducing a studied *ignorance* of patents in the field.[66]

The FTC Report also argues that higher post-trial "reasonable royalty" damages based on the "valid and infringed" assumption offers a sufficient deterrent to infringement.[67] But that deterrent effect is overstated. For example, even when there is certainty that users infringe a valid patent, each such infringer enjoys a non-trivial chance that it will escape detection or benefit from an erroneous adjudication of non-infringement or invalidity. Unless the damages award is increased—beyond what a "valid and infringed" assumption would yield—to account for this effect, the incentive to infringe rather than take a license would remain.

One key feature of any remedial regime is to encourage private ordering that generates adequate incentives for future inventors and their contracting counter-parties to make and commercialize future technologies. Private licensing under the current legal regime has an empirically strong record of motivating investment in both upstream innovation and downstream implementation, in both standardized and non-standardized industries. As we discuss below, the FTC Proposal would predictably depress returns on investment in R&D substantially.

The FTC's zeal to protect infringers is misguided: law and policy should be concerned with using voluntary licenses to foster the proper tradeoffs between innovators and implementers. Investments in the development of new technology come on the front end and are ongoing. Patentees and their contract partners face serious risks—toiling over long periods of time, striking many dry wells—before they enjoy any market rewards. In contrast, infringers generally enjoy numerous advantages over patentees, if only because they know something of the value of a patent that they choose to infringe.[68] In

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[66] *See, e.g.*, Mark A. Lemley & Ragesh K. Tangri, *Ending Patent Law's Willfulness Game*, 18 BERKELEY TECH. L.J. 1085, 1100-01 (2003) (explaining that the willfulness doctrine "creates a strong incentive not to read patents"); Alan Devlin, *The Misunderstood Function of Disclosure in Patent Law*, 23 HARV. J.L. & TECH. 401, 404 (2010) ("[T]he ever-looming danger of treble damages resulting from a finding of willful infringement creates perverse incentives to remain ignorant of patented technology."); Note, *The Disclosure Function of the Patent System (or Lack Thereof)*, 118 HARV. L. REV. 2007, 2020 (2005) (referring to a "perverse incentive for potential infringers not to become too aware"); Robert Greene Sterne, Michael Q. Lee, Patrick E. Garrett, Michael V. Messinger & Donald R. Manowit, *The 2005 U.S. Patent Landscape for Electronic Companies*, 823 PRACTISING L. INST. PATS., COPYRIGHTS, TRADEMARKS, & LITERARY PROP. COURSE HANDBOOK SERIES 293, 353-54 (Mar. 2005) (reporting that "many companies implemented policies to discourage or forbid patent searching by inventors and patent attorneys").

[67] FTC REPORT, *supra* note 7, at 5, 20.

[68] *See, e.g.*, Joseph Farrell & Garth Saloner, *Standardization, Compatibility and Innovation*, 16 RAND. J. ECON. 70 (1985) (formally describing second-mover advantages); Joseph Farrell & Garth Saloner, *The Economics of Horses, Penguins and Lemmings*, in PRODUCT STANDARDIZATION AND COMPETITIVE STRATEGY 1 (H. Landis Gabel ed., North-Holland 1987) (providing illustrative examples of second-mover advantages).

addition, successfully developed products and distribution channels are, by their nature, difficult to keep secret and can serve as working models for competitors to follow, thereby saving them the cost of weeding out worse alternatives. In addition, published patents must teach others how to practice the invention or the patent will be invalid. Again, second movers enjoy a lower cost of capital as investors become educated about the technology's specific risks and potential for profit.[69] Similarly, education of consumers and stimulation of consumer demand will benefit all competitors equally. Indeed, the arrival of a competitor into the market will force the original patentee (or early licensees) to incur added costs of *brand* advertising, on top of the costs of more general *product* advertising already incurred. For all of these reasons, careful attention must be paid to allowing those who invest on the front end in the process of inventing and commercializing new technologies to recoup the return they expect the market may generate for the successes they generate. Instead, the FTC's Proposal not only advantages infringers over innovators, but also advantages infringers over early voluntary licensees.

F. Artificial Constraints Imposed on the Market by the FTC Approach

The FTC's few anecdotes[70] about apparent "outlier" cases of excessive royalties or damage awards are not sufficient to suggest that present incentives are misaligned and certainly provide no justification for regulatory "caps" on either royalties or damages. As with any natural phenomena, the value of innovations will be distributed over a broad range, some low (often zero or negative) and some high—even very high. Similarly, any well-functioning adjudication system will sometimes award damages on the high side of some hypothetical "economic perfection," and sometimes on the low side. Of course, it is the *ex ante* prospect of high returns that bring inventors in at the front end. To attempt to tamp down the high-end returns after they are realized, without equally *increasing* the returns on the low end of the distribution, will simply drive down the *ex ante* anticipated return on investment, thereby discouraging investments in the next innovation cycle. That would deprive everyone in the IP and product marketplace—including both manufacturers and consumers—of the next innovation.

Similarly, the FTC's Proposal to value IP as of a time prior to standardization for purposes of damages awards is neither neutral nor rational. Precedent, since at least the 1970 *Georgia-Pacific* decision, has consistently used a "reasonable royalty" measure of patent damages that is based on an estimate of the royalty that the parties would have agreed to in a negotiation

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[69] *See* U.S. CONGRESS, OFFICE OF TECH. ASSESSMENT, PUB. NO. OTA-BP-ITC-165, INNOVATION AND COMMERCIALIZATION OF EMERGING TECHNOLOGY 3, 20-96 (1995).

[70] *See* FTC REPORT, *supra* note 7, at 161–62.

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conducted at the time of first infringement.[71] In the case of standards-essential patents, the FTC strongly urges the radical change of pushing that "hypothetical negotiation" back to a time before the standard was adopted, on the ground that the articulation of the standard marks the time at which the infringer becomes "locked in" to use of the technology.[72]

The selection of this particular time makes one of two mistakes. Either it ignores the fact that the risk of hold-up is bi-directional, or it is intentionally calculated to empower the infringer to retroactively "hold up" the patent owner so as to drive damages awards (and hence negotiated license fees) as low as possible. If the implementer is "locked in" and vulnerable to hold-up once it has made "sunk costs" investments in a particular technology, so too is an innovator "locked in" to its technology after it has made the R&D investments necessary to develop that technology. Any licensing negotiation conducted at this particular time may leave the innovator no alternative but to accept a price below what it would have agreed to in a negotiation held before it had incurred those R&D costs. Thus, the FTC Proposal rather explicitly invites courts to generate opportunities for hold-up of innovators by infringing manufacturers.

It is also important to appreciate that pegging the damage award to *any* specific time, regardless of when the expropriating infringement occurs, almost inevitably *mis*-values the injury by giving—at far below market value—potential infringers an option to engage in opportunistic behavior, to the disadvantage of innovators. By presuming the government should select one fixed measure of a patent's value, the FTC Proposal would seriously impede the ability for markets to shift, as they must over time, to recognize the ever-changing value of assets. A host of market, technological, and other environmental factors operate over time to increase and decrease the value of particular patented technologies. These factors include changes in the demand for particular technologies over time as a result of economic growth, changes in consumer preferences, changes in production methods, the development of new products, and changes in transaction methods. They also include the introduction of competing technologies (decreasing value) or the development of complementary technologies (increasing value) as well as decisions by SSOs and government regulations. Each of these

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[71] As the Federal Circuit has stated on several occasions: "The hypothetical negotiation requires the court to envision the terms of a licensing agreement reached as the result of a supposed meeting between the patentee and the infringer at the time infringement began." Minks v. Polaris Indus., 546 F.3d 1364, 1372 (Fed. Cir. 2008) (quoting Hanson v. Alpine Valley Ski Area, Inc., 718 F.2d 1075, 1078 (Fed. Cir. 1983)). *See also* Wordtech Sys., Inc. v. Integrated Networks Solutions, Inc., 609 F.3d 1308, 1319 (Fed. Cir. 2010) ("The hypothetical negotiation 'attempts to ascertain the royalty upon which the parties would have agreed had they successfully negotiated an agreement just before infringement began,' and 'necessarily involves an element of approximation and uncertainty.'") (quoting Lucent Techs. v. Gateway, Inc., 580 F.3d 1301, 1324–25 (Fed. Cir. 2009)).

[72] FTC REPORT, *supra* note 7, at 193.

factors is relevant to determining the actual value provided by particular technologies.

The FTC's "incremental value" standard[73] raises similar problems. It overlooks the reality that the incremental value provided by a technology must inevitably change over time with the movement in other costs of production, market preferences, complementary technologies, and available alternatives. To tie infringement damages to incremental value pegged at a fixed time in the past (before standardization, in the case of standardized technology) is to invite opportunistic behavior by manufacturers, who will face attractive incentives to move into the market and commence infringing should it become evident that the patent provides greater value to them than they had estimated at the pre-standardization (and low information) stage.

The FTC's Proposal to "lock down" the potential damage recovery to the value of the patents at an early date in the value-creation process also distorts efficient market behavior. That rule would enable manufacturers to shift a great deal of risk onto the innovator and those "early adopter" manufacturers who do take licenses (and who instead should perhaps be rewarded for early risk taking). The infringer should not get any collateral benefit because it chose *not* to negotiate and commit to a license at the pre-standardization *ex ante* moment selected by the FTC. At that early time, the technical and market success of the technology was not yet known; the scale and riskiness of investment necessary by manufacturers to commercialize it was speculative; the intensity of competition from other manufacturers and other standards was unknown; capital, if needed, would be expensive risk capital. In this context, the innovator might indeed accept a relatively low rate to induce the manufacturer to take a license and assist in shouldering these risks. But this is precisely what the late-coming infringer did not do. Instead, the infringer has kept its options open, moving into the market only after numerous risks and costs have been reduced or eliminated by others. The viability of manufacturing the implementing devices has been established; consumer demand has been created and proved; the size and price structure of the market is known; the nature of the competition is observable; the cost of capital of the infringer thus falls below the level it was for those who created the market.

FTC's proposed "time of standardization" hypothetical negotiation for patents subject to a RAND commitment[74] is also a rigged construction that

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[73] *Id.* at 185–89 ("Courts should recognize that when it can be determined, the incremental value of the patented invention over the next-best alternative establishes the maximum amount that a willing licensee would pay in a hypothetical negotiation. Courts should not award reasonable royalty damages higher than this amount.").

[74] *Id.* at 194 ("A definition of RAND based on the ex ante value of the patented technology at the time the standard is set is necessary for consumers to benefit from competition among technologies to be incorporated into the standard – competition that the standard setting process itself otherwise displaces.").

would play out badly over time for everyone in the IP marketplace. It combines disparate elements of traditional damage formulas in a way that is biased against the patentee. The FTC selects this time because the manufacturer has yet to incur any standard-specific sunk costs (while the innovator has sunk all of its R&D costs) affording the manufacturer optimal bargaining power over the patentee.[75] But, if we travel back to a pre-standardization moment, then no RAND obligation yet existed, and the patentee negotiating at that time retained its full power to exclude anyone who was not prepared to agree to an arrangement that provided adequate compensation for the patentee's investments (potentially with a view towards exploiting its inventions in a proprietary manner or contributing them to a different and competing standard). Yet, the FTC is emphatic that the power to exclude and the value of that power must be ignored from its reconstituted hypothetical negotiation that fails to correspond to actual rights and incentives that real parties face at *any* point in time. The simple reality is that, before a standard is set, it just is not clear whether a patent might become more or less valuable. Some upward pressure on value may be created later, to the extent that the patent is important to a standard that is important to the market. In addition, some downward pressure may be caused by a later RAND commitment or some other factor, such as repeat play. The FTC seems to want to give manufacturers all of the benefits of both of these dynamic effects by, in effect, giving the manufacturer the free option of picking different focal points for elements of the damages calculations. The patentee is forced to surrender all of the benefit of the upward pressure while the manufacturer is allowed to get all of the benefit of the downward pressure.

In short, there is no economic basis to equate a manufacturer that is willing to commit to license terms before the adoption and launch of a standard with one that instead expropriates patent rights at a later time through infringement. The two bear different risks, and the late infringer should not pay the same low royalty as a party that sat down at the bargaining table and may actually have contributed to the value of the patent through its early activities. There is no economically meaningful sense in which any royalty set higher than that which a "willing licensee would have paid" at the pre-standardization moment somehow "overcompensates patentees by awarding more than the economic value of the patent."[76] The existing law of "reasonable royalty" patent damages, which measures the value of the good (the license) at the time it is expropriated by unilateral action of the infringer (the time that infringement begins) correctly takes into account the informational and risk advantages enjoyed by the infringer.

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[75] *Id.* at 192.
[76] *Id.* at 170.

G. The Ineffectiveness of Incremental Value in Calculating Damages

The FTC proposes that courts should treat so-called "incremental value" as a "cap" on whatever measure of damages that other methods of valuation might produce.[77] In fact, it is neither possible nor desirable for courts to do so.

First, it is a serious mistake to suppose that there is any such unique number that counts as *the* incremental value of a patent. Generally, different buyers will derive different benefits from implementing any particular technology. These differences will depend on the buyer's complementary assets, other technologies, final products, organizational structure, technological knowledge, and many other factors. Also, because different buyers have different benefits from any particular technologies, the next best alternative for each may differ whenever multiple alternatives are available in the marketplace. Different buyers may rank alternatives very differently, some preferring technology *A*, some technology *B*, and others technology *C*, either alone or in conjunction with other processes, including some covered under trade secrets. As a consequence of these factors, buyers are likely to derive very different incremental benefits for any particular technology. Would those market participants with the highest, lowest, or average benefits provide the principled basis for the "incremental value pricing" regulation?

The bottom line is that because buyers differ, there is no uniform "incremental value price" around which to organize the FTC's proposed ratemaking venture. Because the concept of "incremental value" fails to describe some measurable attribute that meaningfully relates to the diverse and dynamic marketplace of the real world, it should not be given any prescriptive weight.

Nor can it possibly be a right answer to seek "the incremental value for this particular infringer," as the Report's reference to "the maximum rate *the infringer* would pay" suggests.[78] The FTC's approach would result in highly varied "prices" for the same patent to different manufacturers, thereby introducing two vices. The first is to violate the RAND policies without cause. The second is to potentially reward the inefficient infringer.

Second, although the whole concept of "incremental value" is a useful intellectual construct when *describing* purchaser conduct in simplified academic models, the complexity of the real world makes it essentially useless as a tool for *prescribing* pricing. A single patented invention will often have multiple identifiable "alternatives"—whichever is the "next best" may vary from purpose to purpose and user to user. Ultimately, the issue may turn

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[77] *Id.* at 194 ("Courts should apply the hypothetical negotiation framework to determine reasonable royalty damages for a patent subject to a RAND commitment. Courts should cap the royalty at the incremental value of the patented technology over alternatives available at the time the standard was defined.").

[78] *Id.* at 168.

fundamentally into disagreements of opinion rather than those of fact. What "incremental value" the patent provides across any one of those alternative pairs will be the subject of extensive speculation. These difficulties will compound when the same test is applied to each of the multiple standards incorporated into a complex device using a large number of patented technologies, each of which has numerous and debatable "alternatives." It is to avoid such piecemeal disputes that the relevant licenses in the real world are consistently negotiated on a portfolio basis. The complex institutional framework makes it apparent that no meaningful "incremental value" calculation can be done.

Third, as the discussion above suggests, *Georgia-Pacific* is wise to give the greatest weight to evidence of actual market pricing (through actual licenses) of the patents in dispute or, when need arises, of comparable patents. The FTC Report flies in the face of RAND commitments if it means to suggest that courts should use "incremental value" as a cap even over valuation established by reference to comparable licenses, once again signaling that infringers may obtain a price *advantage* over those who negotiate licenses. We do not need to elaborate on the perverse incentives and results that this signal would produce.

Fourth, while this article focuses on patents incorporated into standards subject to RAND commitments, the FTC's recommendations are not so narrowly limited. We thus note briefly that the FTC's approach to patent damages entirely omits the value of the patent owner's right to exclude, which includes the right to grant an exclusive license or to limit the class of nonexclusive licensees.[79] The FTC would give an infringer's right to expropriate priority over the patent owner's right to exclude.

The FTC's approach to measuring reasonable royalty is very specific: "The Commission recommends that courts award reasonable royalty damages consistent with the hypothetical negotiation analysis and willing licensor/willing licensee model." The FTC Report defines this model so

[79] The FTC approach also runs afoul of the classic make-or-buy decision that has been famously studied in depth over the past century of economic research into the boundary between the business firm and the market. That extensive literature has conclusively shown that the serious efficiency tradeoffs are so varied and complex that one solution most assuredly does not fit all cases. The FTC states that lost profits damages will never be appropriate when the patentee does not manufacture a product. *Id.* at 143. But why? The essence of efficient markets is specialization by function. There is nothing sinister or illegal about gathering together a suite of patents that is then licensed on an exclusive or nonexclusive basis to other parties that use them to manufacture. The nonexclusive license is of critical importance in this regard because it allows the same advanced technology to be licensed to firms in an entire industry. The lost profits measure of damage is therefore as appropriate for these licensing cases as it is for any manufacturing cases. There is no reason whatsoever for the law to favor those firms that integrate internally over those that integrate across the market. It is thus a mistake to undermine the willingness to license by depriving the licensee of the remedies that make the system go. As between the licensor and licensees, contracts can handle the relevant issues.

narrowly that it forecloses the value of an exclusive licensee. Its key passage runs as follows:

> Concerns about compensating unproven lost profits damages should not be allowed to inflate a reasonable royalty damage award beyond the maximum amount that a willing licensee would have paid. Arguments that the patentee would reject that maximum amount are based on an assumption that the patentee could have made more by not licensing, which means it sold a product. But if the patentee were better off selling or licensing the invention exclusively, it should be entitled to damages based on lost profits. When a patentee has failed or chosen not to prove its lost profits, allowing amorphous or unproven claims of harm to override the hypothetical negotiation's requirement of a willing licensee risks damage awards that are unconnected to the economic value of the invention. This result misaligns the patent system and competition policy by overcompensating patentees compared to a market absent infringement.[80]

Having thus ruled out royalties from exclusive licensing, the FTC Report then recommends that all but one of the fifteen traditional factors for determining reasonable royalties from the well-known *Georgia-Pacific* case be eliminated from consideration by the courts.[81] The only factor that remains is number 15: "The amount that a licensor (such as the patentee) and a licensee (such as the infringer) would have agreed upon (at the time the infringement began) if both had been reasonably and voluntarily trying to reach an agreement."[82]

The FTC Report characterizes this hypothetical bargain between the infringer and the patentee—a willing buyer and a willing seller—as representing the competitive marketplace. But its calculations bear no relationship to how royalties are calculated in any known competitive market. A competitive market allocates goods to the highest value users. By that standard, a rational patentee wants to license the patented technology to those users offering the highest royalties.[83] The forced bargain that the FTC envisions between the patentee and the infringer need not be the best bargain and need not be the bargain that would be observed in the market.

As a matter of general principle, economic theory has long recognized that any measure of value must include the opportunity costs borne by an

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[80] *Id.* at 172.

[81] Georgia-Pacific Corp. v. U.S. Plywood Corp., 318 F. Supp. 1116, 1120 (S.D.N.Y. 1970) (reviewing fifteen factors).

[82] *Id.*

[83] The FTC Report seems to recognize this possibility whose implications it ignores in examining damages options:

> One way a patentee can innovate is to develop and commercialize the invention itself. For a patentee producing a patented product, the primary importance of the patent is often the right it confers to exclude competitors from making and selling a competing product incorporating the patented technology. Often the most effective way to remedy infringement in this context is by awarding the patentee its profits on sales of the patented product that it lost due to the infringement.

FTC Report, *supra* note 7, at 150.

asset holder. But the patentee's opportunity cost of being forced to be a "willing" licensor to any and all infringers strips it of opportunity to license someone else who values the technology more than the infringer. That higher value user may take advantage of economies of scale, transaction efficiencies, and market returns associated with exclusivity. Even with a RAND commitment, the patent owner retains the valuable right to exclude (not merely receive later compensation from) manufacturers who are unwilling to accept reasonable license terms. Indeed, the right to exclude influences how those terms should be calculated, because it is quite likely that prior licensees in at least some areas will pay less if a larger number of parties are allowed to use the same technology. Those interactive effects are ignored in the FTC calculations.

H. The Fundamental Unsoundness of Taking Into Account the Infringement-Specific Investments of the Infringer

After arguing that "transaction [that is, infringement] specific investments" by the infringer create an opportunity for "hold-up," the FTC implicitly proposes that to avoid this alleged "hold-up," the infringer's investment costs should be deducted from any patent infringement damage award: "Recommendation. To prevent damage awards based on switching costs, courts should set the hypothetical negotiation at an early stage of product development, when the infringer is making design decisions and before it has sunk costs into using the patented technology."[84] Accordingly, the FTC's hypothetical negotiation framework calculates the value to the infringer before sinking costs of using the patented technology, which effectively means that the infringer's value is net of the costs of using the patented technology. The FTC's hypothetical negotiation essentially deducts the infringer's investment costs from any patent infringement damage award. This has the perverse effect of reducing the value of any patent infringement damage award by at least an amount equal to the infringer's investment costs. This Proposal would injure innovators and create seriously perverse incentives for manufacturers.

First, if manufacturers invest with varying efficiency in specific technologies, then subtracting "infringement specific investments" from infringement damage awards will generate differential pricing for different manufacturers for the same (expropriated) license rights. But it cannot be that either the "fair market value" of a license (or a "reasonable" fee in the case of a RAND commitment) varies on a case-by-case basis with the particular efficiencies of the individual manufacturer.

Second, this differential pricing will strip licensed manufacturers of their hard-earned advantage by favoring infringers.

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[84] *Id.* at 22.

Third, the FTC Proposal eliminates the legitimate competitive advantage of more efficient manufacturers through a subsidy for inefficient manufacturers. This new doctrine makes the innovator and its licensees into insurers for inefficient investment by infringers.

Fourth, the FTC Proposal violates the basic patent law principle that the patent-owner should not be made worse off by the infringer's choice to infringe rather than take a license. If the value of a license is set with reference to the value of the contribution of a manufacturer of average efficiency, then an inefficient manufacturer would be unable to afford the license and thus stay out of the market. Most of the lost sales of that manufacturer will go to other, more efficient manufacturers who pay market rate royalties to the patent owner. It makes no sense to allow inefficient manufacturers the option to pay a *below* market "reasonable royalty" in ways that decidedly injure the patent holder and more efficient licensees.

Finally, this unsound Proposal also asks courts to mix yet another extremely speculative and debatable term into the damages equation. Even if the infringer's investment in infringing were somehow to be viewed as transaction specific, it would be practically impossible in litigation to determine what expenses were exclusively specific to developing the infringing device and what expenses had other actual or potential value to the infringer. Put differently, the extent of the infringer's costs that are specific to any hold-up and cannot be recouped are only those costs of retooling their investment towards non-infringing uses.

I. The Stark Inconsistency Between the FTC's Approach and the Key Role Historically Played by Predictable Rules for Patent Enforcement in the Successful Commercialization of Inventions as Well as Overall Competition and Social Welfare

In yet another mistake, the FTC gives inadequate weight to key concepts in law and economics when setting its rules for patent remedies. Predictable enforcement of patents provides appropriate incentives to make inventions and bring them to market. Those incentives are not merely directed toward inventors. They necessarily reach all of the many actual and potential contracting parties the patentee must do business with for the technology to be commercialized. Although some categories of interactions do count as hold-up, they are limited in practice and largely peripheral to the use of patented technology by SSOs. In other contexts, there are a host of institutional arrangements that parties use to significantly mitigate the risk of hold-up. And in settings involving interactions among strangers, the law has similarly evolved a host of other mitigating institutions.

All too often, patent skeptics voice fears that strengthening patents will bring a flood of patent lawsuits, grinding to a halt the wheels of future commerce. At the same time, some patent defenders insist that weakened

patents will be so worthless that nobody will bother to get them. Much has been written on both sides of these debates, which we will not enter into here. However, one predictable structural effect of weakened patent enforcement deserves mention. Specifically, the changes proposed by the FTC will lead to subtle but important shifts in the commercialization of new technologies and the overall structure of the competitive landscape. Many of these changes will be to the benefit of large firms which have the means of exploiting their own inventions and capturing value through product sales but to the detriment of overall levels of market innovation, including efforts by smaller firms and entrepreneurial startups that rely on patent protections and licensing revenues. In addition, the FTC Proposal reduces voluntary contracting and increases patent litigation and potential private and regulatory antitrust enforcement actions challenging negotiated license terms. The burdens of these developments will fall particularly heavily on startups and market entrants, again favoring well-funded incumbents. All of this will discourage the small-scale entrepreneurship that has historically been a prime catalyst of our high-technology economy.

Recent history has given us at least two striking natural experiments about how this works.[85] The first tells the story of the presence of patents as a key to increased competition and commercialization. The second tells the story of the absence of patents as a key to monopoly.

Before 1980, the United States, Europe, and Japan all had held the view that patents in the area of basic biotechnology could not overcome a range of vaguely defined so-called "public policy" objections. As a result, patents on basic biologicals were not reliably available or enforced. Patents on pharmaceuticals were. Then, thanks to the 1980 Supreme Court decision in *Chakrabarty*,[86] basic biologicals suddenly could enjoy meaningful patent protection for both products as well as testing methods and devices. That change was in only the U.S. market and only after 1980. The immediate result was remarkable revival, but only in the United States, of small- and medium-sized biotechnology companies and a drastic increase in the number of new drugs and new medical devices brought to market. All of this new activity resulted in high rates of invention that occurred simultaneously with the renewed success of large pharmaceutical firms, whose own business opportunities increased with the higher rates of development.[87]

The software industry offers a parallel story in a setting where the absence of patents was linked with the rise of a monopoly. The U.S. courts

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[85] *See generally* Kieff, *supra* note 20, at 420–21.

[86] Diamond v. Chakrabarty, 447 U.S. 303 (1980).

[87] *See, e.g.*, Heather Hamme Ramirez, *Defending the Privatization of Research Tools: An Examination of the "Tragedy of the Anticommons" in Biotechnology Research and Development*, 53 EMORY L.J. 359 (2004) ("Since 1992, the number of biotech patents granted has increased substantially, and the industry has more than tripled in size. New biotech drug and vaccine approvals rose from two in 1982 to thirty-five in 2002.").

had allowed themselves to accept the view that patents on computer software and methods of doing business were, like patents on living organisms, inconsistent with a range of vaguely defined so-called "public policy" notions that stemmed from the 1972 Supreme Court decision in *Benson*[88] up through the 1980s and into the 1990s. It was only after the 1994 appellate court decision in *Alappat*[89] that the single biggest Microsoft competitor—Google— was able to come to market in the United States, relying on strong patents and trade secrets.[90] In the words of Judge Jerome Frank: "predictable enforcement of patents helps give the Davids the vital slingshots they need to take on the Goliaths."[91]

These episodes should lead the FTC to rethink its position and should discourage others at home and abroad from following it. The bedrock of a sound patent policy lies in the firm and practicable enforcement of property and contract rights around patents. That fundamental decision lies at the foundation of the stable business relationships that drive the whole commercialization process. Absent that enforcement, most work will be done within firms and not among them. The gains from trade and specialization will therefore necessarily be curtailed, as will the public dissemination of knowledge that comes from patent filings. This will increase the threat of monopoly power, and decrease economic growth, job formation, as well as decrease the availability of innovation to consumers.

V. CONCLUSION

The dynamic effects of the FTC Proposal are particularly ironic. Infringing firms will be encouraged to engage in non-cooperative strategic behavior when it pays for parties to ignore patents and spurn licenses *ex ante*. These firms will prefer instead to run the modest risk of suits for infringement, given the decreased remedies *ex post*. Further, any early adopter firms that do take *ex ante* licenses would likely be put at a competitive disadvantage against infringers *because* those early adopters made the significant early investments necessary to develop products and markets for the licensed technology.

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[88] Gottschalk v. Benson, 409 U.S. 62 (1972).

[89] In re Alappat, 33 F.3d 1526 (Fed. Cir. 1994).

[90] According to its own patent information database, Google is the original assignee of over 550 U.S. patents. Google Patents, http://google.com/patents. U.S. Patent 6,285,999, the patent on PageRank, the foundational algorithm for Google's search technology, is owned by Stanford University and exclusively licensed to Google. Richard Brandt, *Starting Up: How Google Got Its Groove*, STANFORD MAG., Nov.–Dec. 2004, *available at* http://www. stanfordalumni.org/news/magazine/2004/novdec/features/startingup.html (last visited Aug. 1, 2011). Google also recently acquired over 1000 patents from IBM. Don Reisinger, *Google Acquires Over 1,000 IBM Patents*, CNET, July 29, 2011, http://news.cnet.com/ 8301-13506_3-20085418-17/ (last visited Aug. 1, 2011).

[91] Picard v. United Aircraft Corp., 128 F.2d 632, 643 (2d Cir. 1942) (Frank, C.J., concurring).

The key criticism of the FTC Report relates to the basic principles of social and economic interaction. The law dealing with tangible property seeks to facilitate voluntary agreements rather than unilateral appropriation of the property of others. These principles apply with equal force to all forms of intellectual property. In the effort to see what is distinctive in IP, the FTC has lost sight of how that body of law connects to larger systems of property and contract that define the parameters in which any liberal society must operate. Our hope is that once the FTC sees those connections, it will decide to significantly rein in the recommendations in its recent Report.

SSOs are wise in not having voluntarily adopted the rules for patent licensing terms that the FTC would now impose on all of them by judicial fiat. That is because those rules would create powerful incentives for behavior that would so significantly decrease overall value in the IP marketplace that, from a true *ex ante* position, not even potential licensees would rationally choose to vote for them.

The FTC has not identified sufficient evidence to raise serious doubt about the current efficiencies of the IP marketplace. The default assumption should be that that the consensus SSO IP licensing policies and practices are well-tuned to ensure balanced incentives to all necessary participants in the chain of innovation and commercialization, both to make necessary investments and to participate in the standardization process. And, indeed, the available empirical evidence suggests that these existing rules and practices work well. If sound empirical evidence of a problem requiring legal intervention did emerge, then responses should be far more carefully targeted than the approaches in the FTC Report. They also should be far more attentive, through careful dynamic analysis, to the risks of unintended consequences, such as creating perverse incentives for infringement, against licensing, and against the investment essential for later rounds of innovation.

The FTC advances no evidence for the alleged problems of patents and SSOs and fails to address the considerable evidence that markets and SSOs function effectively. The interests of consumers are well represented by SSOs and competition among technology implementers who, at the end of the day, must make goods and services that people wish to purchase. Government interference with SSOs and innovation will only harm the interests of consumers, creating yet another example of government hold-up.[92]

For all of these reasons, a posture of regulatory restraint is appropriate; embracing caution against the Proposal or adoption of the types of changes to the current remedies for patent infringement that are in the FTC Proposal. The high costs of shifting a massive slice of the economy into a regime of judicial price regulation are not worth incurring only to address

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[92] For other examples of government hold-up long studied in the economic literature, see *supra* note 19.

potential problems that are, at most, peripheral to the overall success of SSOs in particular and the IP marketplace in general.

APPENDIX: EXCERPTS FROM QUALCOMM LICENSE AGREEMENTS

While individual license agreements are regularly covered by confidentiality agreements that prevent their disclosure, Qualcomm licensing executives have informed us that the provisions quoted in the below table are excerpted from actual license agreements entered into with various licensees, by which Qualcomm granted rights extending to potential standards that had not yet been adopted at the time the license was negotiated and in some cases would not be adopted for some years.

Table A1. Excerpts from Qualcomm License Agreements

Excerpt from License Agreement	Licensee and Year
"Common Air Interface Specification" means the technical description of the DS-CDMA air interface between cellular cell site or base station transceivers and Subscriber Units (also referred to as the "Air Interface Specification" or the "Specification").	American Handset Manufacturer, 1990
"Common Air Interface" or "CAI" means the technical description of QUALCOMM's CDMA digital air interface specification for communication between Cellular cell site or other Cellular base station transceivers and Subscriber Units, including without limitation, the Mobile Station-Base Station Compatibility Specifications and the Mobile Station performance requirement specifications being developed by QUALCOMM.	European Handset Manufacturer, 1992
"Common Air Interface" or "CAI" means the Telecommunications Industry Association (TIA) IS-95 digital cellular standard and any other CDMA Wireless standard that may be adopted by the TIA or other standards bodies in the Territory, and any de facto CDMA Wireless standard.	Japanese Handset Manufacturer, 1993
"Common Air Interface" or "CAI" means the technical description of QUALCOMM's CDMA digital air interface specification for communication between cell site or other Base Station transceivers and Subscriber Units as may become adopted as a standard by the Telecommunications Industry Association (TIA) and other international standards bodies.	Korean Handset Manufacturer, 1993
"CDMA Wireless Industry Standard" means standards for public code division multiple access communications including but not limited to IS-95A, IS-96A, IS-127, ANSI J-STD-008, the proposed ETSI UMTS standard, their subsequent releases, revisions and derivations, and any local and regional standards based substantially thereon, any wireless local loop or wireless PBX (private branch exchange) systems based substantially thereon, and the Globalstar Satellite System. For the purposes of this Agreement, including but not limited to determining whether a patent is a CDMA Technically Necessary Patent, CDMA Wireless Industry Standard includes all of the above-described standards and systems but does not include the GSM standard or any other standard which utilizes a TDMA over-the-air interface.	European Handset Manufacturer, 1998
"CDMA Applications" means all communications applications (regardless of the transmission medium) which operate using code division multiple access ("CDMA") technology, whether or not based on IS-95 Related Systems, cdma2000 or W-CDMA, and irrespective of frequency band.	European Handset Manufacturer, 1999

EXHIBIT 8

REASONABLE AND NONDISCRIMINATORY (RAND) ROYALTIES, STANDARDS SELECTION, AND CONTROL OF MARKET POWER

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Two sets of rules are critical for the long-run prospects of the economy: those for the use and dissemination of intellectual property (IP) and those for the establishment of standards promoting the compatibility of products embodying such IP. This article is concerned with issues that arise at the intersection of these sets of rules, particularly those dealing with the effects on competition of the adoption by standard-setting organizations (SSOs) of interface and other compatibility standards in which private parties own intellectual property rights. We focus especially on reasonable and nondiscriminatory (RAND) licensing commitments that SSOs may impose or solicit in the course of standard setting to avoid conferring market power on private IP holders. We evaluate these practices in relation to economic theory and the policies of the antitrust and intellectual property laws.

From the point of view of the general welfare, any system of rules affecting innovative intellectual property is beset by an inherent tension between (1) providing effective incentives for investment of labor and other valuable resources in the difficult, expensive, and risky activities required for innovation, and (2) facilitating and encouraging rapid dissemination and adoption of new products and processes to replace obsolete ones. It may well be thought that success in the latter generally can be achieved only at the expense of the former, and vice versa. The

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more quickly and inexpensively inventions are available for use by all suppliers to a market, the smaller the reward that the possessor of the entailed intellectual property apparently can hope to obtain.

This conflict was once thought a characteristic of the relationship between the IP and antitrust laws themselves: the "patent and antitrust laws necessarily clash."[1] Modern antitrust doctrine, however, views the two legal regimes as sharing "the common purpose of promoting innovation and enhancing consumer welfare,"[2] functioning as complementary instruments that work in tandem to strike the socially optimal balance between rewarding innovation and promoting the diffusion of new technology.

The intellectual property laws pursue this common purpose by conferring certain legal rights to exclude others, thereby "help[ing] the owners to profit from the use of their property."[3] Doing so provides arguably suitable incentives for the innovation process.[4] "In the absence of [these] rights, imitators could more rapidly exploit the efforts of innovators and investors without compensation. Rapid imitation would reduce the commercial value of innovation and erode incentives to invest, ultimately to the detriment of consumers."[5]

As a practical matter, these rights typically result in prices that are elevated for a limited time compared to those that would be observed in the absence of IP protections. If the patent and copyright laws are appropriately designed, as will be assumed throughout this article, then this difference in price levels provides a surplus that constitutes a socially

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[1] SCM Corp. v. Xerox Corp., 645 F.2d 1195, 1203 (2d Cir. 1981) ("While the antitrust laws proscribe unreasonable restraints of competition, the patent laws reward the inventor with a temporary monopoly that insulates him from competitive exploitation of his patented art."); *see also* United States v. Westinghouse Elec. Corp., 648 F.2d 642, 646 (9th Cir. 1981) ("There is an obvious tension between the patent laws and antitrust laws. One body of law creates and protects monopoly power while the other seeks to proscribe it.").

[2] *See* U.S. Dep't of Justice & Federal Trade Comm'n, Antitrust Guidelines for the Licensing of Intellectual Property § 1.0 (1995), *available at* http://www.usdoj.gov/atr/public/guidelines/0558.pdf [hereinafter DOJ-FTC Intellectual Property Guidelines]. Courts have cautioned that antitrust enforcement should be careful not to "chill" or "stifle" innovative activity. *See, e.g.,* Berkey Photo Inc. v. Eastman Kodak Co., 603 F.2d 263, 282–83 (2d Cir. 1979).

[3] *See* DOJ-FTC Intellectual Property Guidelines, *supra* note 2, § 2.1.

[4] *See, e.g.,* Kenneth W. Dam, *The Economic Underpinnings of Patent Law,* 23 J. LEGAL STUD. 247 (1994); RICHARD A. POSNER, ECONOMIC ANALYSIS OF LAW § 3.3 (5th ed. 1998). It has been observed that one purpose of the patent system is to promote the availability of information on intellectual property and that the disclosure rules that are applied under patent law are the instruments used to promote this objective. That, however, is surely not the only purpose of the patent system.

[5] *See* DOJ-FTC Intellectual Property Guidelines, *supra* note 2, § 1.0.

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optimal incentive for investment in innovative activity that is properly balanced against the goal of rapid diffusion of technology.[6] To avoid disturbing this balance, antitrust law must avoid penalizing conduct that is reasonably consistent with the enjoyment of such incentives, while preventing acts (otherwise within the reach of antitrust, of course) that have the effect of materially increasing or reducing them. This is no easy task in the simplest of circumstances and is particularly challenging in the context of the standard-setting activities that take place on a daily basis under the auspices of scores of SSOs around the world.

Several fundamental attributes of the standard-setting process are critical to a proper understanding of the complicated environment in which antitrust must operate:

(1) *Compatibility and IP Rights.* Ensuring that products and devices work efficiently in tandem is a major objective of SSOs.[7] Sometimes it is simple for an SSO to set standards that ensure compatibility. For example, electric sockets are easily designed so as to enable them to work with electric bulbs from many different suppliers. But in more sophisticated products, as for example in computers, software, telecommunications, consumer electronics, and the Internet, there can be dozens of complex compatibility specifications, requiring extensive discussion and consultation, before one can arrive at a set of standards to which the affected firms are prepared to adhere. Moreover, technical change can require evolving standards. And compatibility is important for many reasons, not just to permit the different elements of the pertinent products to work together.

(2) *Standard Setting and Market Power.* Another consideration, important for the current discussion, is that standards and associated technical specifications can facilitate entry and competition by promoting substitutability and interoperability of products and processes and by intensifying "intra-standard" rivalry. Such objectives are often viewed as sufficiently compelling to justify SSOs setting standards that require access to proprietary intellectual property rights. On the other hand, while there is no presumption that control of such IP rights automatically or necessarily bestows market or monopoly power on their owners, adopting standards that depend on private IP rights carries the risk of creating a degree of

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[6] For the view that the patent laws are not optimally designed or implemented, see ADAM B. JAFFE & JOSH LERNER, INNOVATION AND ITS DISCONTENTS: HOW OUR BROKEN PATENT SYSTEM IS ENDANGERING INNOVATION AND PROGRESS, AND WHAT TO DO ABOUT IT (2004).

[7] For an excellent survey of SSOs and standard-setting activities, see Mark A. Lemley, *Intellectual Property Rights and Standard-Setting Organizations*, 90 CAL. L. REV. 1889 (2002).

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market power that distorts competition and generates returns in excess of those contemplated by the IP laws.

(3) *Network Externalities Entailed by Standardized IP.* The risk of creating market power through standardization is increased where network externalities prevail. IP is a source of such externalities when the value of access to the IP or of final products relying on the IP increases with the number of users of the technology or its final product. This can give rise to market power in the market for the IP. In addition, where the IP owner is also a producer of the final product, network externalities may allow the proprietor of the IP to exercise market power in the downstream product market. The firm that achieves large sales volume first may, at least for a time, be relatively insulated from competition. This may happen even though that firm is not prospectively the most efficient supplier or its final product is somewhat inferior to that of the holders of substitute intellectual property.

(4) *IP as Downstream Input.* Intellectual property usually is not offered for sale to consumers as a final product. It is more often an *input* to creation or improvement of the final products. When prospective or current rivals of the owner of the intellectual property in the downstream markets for the IP's final product lack access to such inputs, they may not be able to survive. In short, the IP may (but does not necessarily) constitute what is sometimes described as an "essential" input for downstream competition.

In light of these attributes, there is the risk that the standard-setting process may itself be utilized to confer market or monopoly power beyond that contemplated by the intellectual property laws, which, in turn, may distort competition, impede technological dissemination and yield returns to innovation that are *too high.* As Lemley and McGowan frame the overall issue, "[t]he general danger of allowing a private party to own intellectual property rights in an open standard is that the private party may at some point attempt to [distort competition], either by licensing it on discriminatory terms, by setting an unreasonable price for continued access, or simply by denying access (a license) altogether."[8]

Such concerns will be magnified if the IP owner is also a participant in the downstream market, as when the proprietor of an important patent also manufactures electronic devices using that patent. In such cases, license terms may impede or exclude competition in that final-product market. Indeed, a complex standard can be entangled in a

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[8] Mark A. Lemley & David McGowan, *Could Java Change Everything? The Competitive Propriety of a Proprietary Standard,* 43 ANTITRUST BULL. 715, 760 (1998).

"patent thicket," a set of patents owned by different industry participants, each of which can be used to attempt to block others from providing products that meet the adopted standard.[9] A complex piece of equipment, such as a computer, characteristically is made up of components each of which is covered by patents, and the patents pertinent for such an item are usually owned by a number of different firms, many of them direct competitors in the final-product market.[10] Many firms each may be able to bring the manufacturing process of others to a halt. Furthermore, a firm that holds such a blocking patent may be tempted not to reveal this to the other members of an SSO before standards have been agreed upon, in hope that they will be misled to select a standard that this firm will subsequently be able to control and perhaps "hold up" the others for excessive payments.[11]

Mindful of the risk that standard selection may create market power, SSOs commonly require that IP holders commit in advance to license their IP on reasonable and nondiscriminatory or "RAND" terms as a condition of participation in the standard-setting process.[12] Of course, a RAND commitment is of limited value in the absence of objective benchmarks that make clear the concrete terms or range of terms that are deemed to be reasonable and nondiscriminatory. It is widely acknowledged that, in fact, there are no generally agreed tests to determine whether a particular license does or does not satisfy a RAND commitment.[13] This situation has spurred debate, contention, and even public

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[9] See Peter N. Detkin, A Semiconductor Patent Survey, Statement at the FTC/DOJ Hearings on Competition and Intellectual Property Law and Policy in the Knowledge-Based Economy (Feb. 28, 2002) (Power Point slideshow available at http://www.ftc.gov/opp/intellect/020228peterndetkin.pdf) (estimate by executive of world's largest semiconductor company that there were more than 90,000 patents generally related to microprocessors held by more than 10,000 parties in 2002); see generally Carl Shapiro, Navigating the Patent Thicket: Cross Licenses, Patent Pools, and Standard Setting, in 1 INNOVATION POLICY AND THE ECONOMY 119 (Adam B. Jaffe, Josh Lerner & Scott Stern eds., 2002); but see Ronald J. Mann, The Myth of the Software Patent Thicket: An Empirical Investigation of the Relationship Between Intellectual Property and Innovation in Software Firms (Univ. of Tex. Sch. of Law, Law and Economics Working Paper No. 022, Feb. 2004).

[10] See FEDERAL TRADE COMM'N, TO PROMOTE INNOVATION: THE PROPER BALANCE OF COMPETITION AND PATENT LAW AND POLICY ch. III(IV) (2003) [hereinafter FTC PATENT REPORT].

[11] We address the general issue of IP non-disclosure in Part V below.

[12] Lemley, supra note 7, at 1906; Mark R. Patterson, Inventions, Industry Standards, and Intellectual Property, 17 BERKELEY TECH. L.J. 1043, 1053–54 (2002); Scott K. Peterson, Patents and Standard-Setting Processes, Statement at the FTC/DOJ Hearings on Competition and Intellectual Property Law and Policy in the Knowledge-Based Economy (Apr. 18, 2002), available at http://www.ftc.gov/opp/intellect/020418scottkpeterson.pdf.

[13] See, e.g., R. Hewitt Pate, Ass't Att'y Gen., Antitrust Div'n, U.S. Dep't of Justice, Competition and Intellectual Property in the U.S.: Licensing Freedom and the Limits of Antitrust, Speech at 2005 EU Competition Workshop (June 3, 2005), available at http://

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and private litigation. Indeed, it has been said that "litigation over 'fair,' 'reasonable,' 'nondiscriminatory' license terms is unusually long and protracted, imposing significant costs on patent owners and SSO members engaged in these disputes."[14] As we explain in this article, however, objective models do exist for evaluating RAND compliance in a manner fully consistent with the policies of both the antitrust and IP laws.

Part I of this article reviews how selection of a standard can confer market power on the owner of proprietary intellectual property, even when standard selection occurs in an environment where many contending technologies are on offer. This is particularly likely in markets characterized by network externalities. The article next undertakes to develop interpretations of the RAND commitment that are consistent with antitrust and intellectual property law. Given that those laws do not generally affirmatively limit royalties charged by IP holders to levels consistent with *ex ante* (rather than *ex post*) market power, Part II identifies an auction-like model for private control of market power that provides a basis (and conceptual criteria) for confirming that particular royalties are "reasonable" (the "R" in RAND). Part III proposes a formula for royalties that are "nondiscriminatory" (the "ND" in RAND). This formula is based on the principle of the "efficient component pricing rule" (ECPR), which is shown to be both necessary and sufficient for a license fee to be competitively neutral in downstream markets. It is, therefore, at least on that basis, a necessary condition for the fee to be nondiscriminatory.

Part IV shows that RAND royalties, interpreted on the basis set forth in Parts II and III, provide suitable incentives for voluntary licensing, and provide benefits to both the licensor and the licensee. This is accomplished by offering *the licensee* all of that portion of the total profits that is made possible by any superiority in its efficiency in utilization of the IP in question, and by ensuring *the licensor* at least as much profit as it could obtain through refusal to license. Part V addresses the issue of disclosure of intellectual property rights in standard-setting exercises, highlighting the tension that exists in designing SSO disclosure policies between promoting the legitimate interests of standard setting and preserving competitive incentives for innovation. We also analyze the rela-

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www.usdoj.gov/atr/public/speeches/209359.htm ("A difficulty of RAND . . . is that the parties tend to disagree later about what level of royalty rate is 'reasonable.'"); Lemley, *supra* note 7, at 1905–06, 1964–65; Patterson, *supra* note 12, at 1053 (noting that "the definition of 'reasonable' [as used in RAND] is not so clear" and that "standard-setting bodies themselves make little effort to define the term").

[14] Patrick D. Curran, *Standard-Setting Organizations: Patents, Price Fixing, and Per Se Illegality,* 70 U. CHI. L. REV. 983, 993 (2003).

tionship between nondisclosure by participants in a standard-setting process and RAND licensing obligations, and propose that the appropriate RAND royalty for an intentionally undisclosed IP right should be the incremental cost of licensing.

I. MARKET POWER BEFORE AND AFTER STANDARD SELECTION

The patent and copyright systems give the possessor of IP a grant of what is sometimes referred to as a "temporary monopoly," although this loose terminology can be misleading.[15] It is by now largely agreed that the mere possession of a patent, copyright, or other intellectual property right does not in itself warrant any presumption of market or monopoly power and that the power (if any) conferred by an intellectual property right is a function of the availability of substitutable technology or products.[16] As a practical matter, market power in technology markets is often measured by reference to the size of the set of alternative technologies that can be substituted for one another at comparable user costs.[17] A market with two, three, or four alternative types of technology may be

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[15] *See, e.g.,* Berkey Photo, Inc. v. Eastman Kodak Co., 603 F.2d 263, 291 n.49 (2d Cir. 1979) ("Kodak held a temporary monopoly in C-41 processing and equipment only in the sense that every firm initially possesses a 100% market share in its own innovations and the peripheral products and services associated with it."); SCM Corp. v. Xerox Corp., 645 F.2d 1195, 1203 (2d Cir. 1981) ("[T]he patent laws reward the inventor with a temporary monopoly that insulates him from competitive exploitation of his patented art. When the patented product, as is often the case, represents merely one of many products that effectively compete in a given product market, few antitrust problems arise."); DOJ-FTC Intellectual Property Guidelines, *supra* note 2, § 2.2; Jaffe & Lerner, *supra* note 6, at 7 ("A patent . . . creates a kind of monopoly for its owner, although the breadth and hence significance of this monopoly depends on the breadth or extent of the patent grant.").

[16] *See* DOJ-FTC Intellectual Property Guidelines, *supra* note 2, § 2.2; Jefferson Parish Hosp. Dist. No. 2 v. Hyde, 466 U.S. 2, 37 n.7 (1984) (O'Connor, J., concurring); Unitherm Food Sys., Inc. v. Swift-Eckrich, Inc., 375 F.3d 1341, 1363–66 (Fed. Cir. 2004), *cert. granted in part,* 125 S. Ct. 1396, *cert. denied,* 125 S. Ct. 1399 (2005); *In re* Independent Serv. Orgs. Antitrust Litig., 203 F.3d 1322, 1325–26 (Fed. Cir. 2000); C.R. Bard, Inc. v. M3 Sys., Inc., 157 F.3d 1340, 1368 (Fed. Cir. 1998); Town Sound & Custom Tops, Inc. v. Chrysler Motors Corp., 959 F.2d 468, 479–80 (3d Cir. 1992); Abbott Labs. v. Brennan, 952 F.2d 1346, 1354–55 (Fed. Cir. 1991). *But see* Independent Ink, Inc. v. Illinois Tool Works, Inc., 396 F.3d 1342 (Fed. Cir. 2005) (holding that a rebuttable presumption of market power in patent tying cases is mandated by Supreme Court precedent), *cert. granted,* 125 S. Ct. 2937 (2005).

[17] *See* HERBERT HOVENKAMP, MARK D. JANIS & MARK A. LEMLEY, IP AND ANTITRUST: AN ANALYSIS OF ANTITRUST PRINCIPLES APPLIED TO INTELLECTUAL PROPERTY LAW § 4.1c at 4-7 & § 4.3c1 at 4-48 (2003). Of course, there may be no market power in the technology market even if the alternative technology set is small, if there is vigorous rivalry from substitute goods in the market for the final product than makes use of the technology.
306*See* DOJ-FTC Intellectual Property Guidelines, *supra* note 2, § 3.2.2.

reasonably competitive (and a market with five may be eligible for inclusion in the antitrust "safety zone" prescribed by the DOJ-FTC Intellectual Property Guidelines).[18]

Standard-setting exercises normally arise only when there are technological alternatives to select among, and so, almost by definition, are likely to occur in competitive—perhaps very competitive—technology markets. Even when conditions are competitive before the selection of a standard, however, the act of selection may lead to increased *ex post* market power for owners of the IP necessary to practice the winning standard.

Selection as a proprietary standard may affect relative beliefs about quality, leaving at least some (and perhaps many) market participants to view alternative technologies as less close substitutes for the designated technology. Standard-setting activities often involve testing and comparative evaluation of competing technologies.[19] Victory in such a process— at least one whose outcome has not been skewed by noticeably biased procedures—bestows credibility and is likely to convey favorable information to the market about the quality of the technology in question or unfavorable information about the relative quality of alternative candidates.

Selection also can affect market expectations about future commercial success, which can be particularly significant when standard setting occurs in network markets. Much has been written about network effects and the phenomena of path dependence, critical mass, and tipping in network markets.[20] In such markets, demand is strongly influenced by buyers' forecasts of future sales and the ultimate size of the network because the value of the product increases as the number of users grows.[21] Actions that can lead to improved expectations, such as the endorsement

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[18] *See* DOJ-FTC Intellectual Property Guidelines, *supra* note 2, § 4.3.

[19] Access to the detailed results of such analyses may be limited to those who have entered into non-disclosure agreements.

[20] *See, e.g.*, LUÍS M.B. CABRAL, INTRODUCTION TO INDUSTRIAL ORGANIZATION 311–34 (2000); OZ SHY, INDUSTRIAL ORGANIZATION: THEORY AND APPLICATIONS 253–77 (1995); Stanley M. Besen & Joseph Farrell, *Choosing How to Compete: Strategies and Tactics in Standardization*, 8 J. ECON. PERSP. 117 (1994); Michael L. Katz & Carl Shapiro, *Technology Adoption in the Presence of Network Externalities*, 94 J. POL. ECON. 822 (1986); Michael L. Katz & Carl Shapiro, *Network Externalities, Competition, and Compatibility*, 75 AM. ECON. REV. 424 (1985).

[21] *See, e.g.*, CABRAL, *supra* note 20, at 312–14; CARL SHAPIRO & HAL VARIAN, INFORMATION RULES; A STRATEGIC GUIDE TO THE NETWORK ECONOMY 230 (1999) ("We have stressed the importance of expectations as a driver of positive feedback in network markets: confidence breeds success, while doubt spells doom."); Besen & Farrell, *Choosing How to Compete, supra* note 20, at 118 ("*expectations* about the ultimate size of the network are crucial").

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of some technology by a standard-setting body, can yield large—even decisive—benefits in the marketplace. "In these circumstances, victory need not go to the better or cheaper product: an inferior product may be able to defeat a superior one if it is widely expected to do so."[22] Regardless of whether the selected standard is the best or the cheapest, the point for present purposes is that the effectiveness of the competitive constraints on the winning technology before selection can be undermined after selection if network effects are strong.[23]

Finally, selection of a proprietary technology as a standard can reduce *ex post* competitiveness in the relevant technology market because licensees (or prospective licensees) incur durable investments tailored to the selected standard that give rise to non-negligible switching costs.[24] Such investments can take many forms.[25] The choice of technology may stimulate specialized investments in learning the techniques involved and digesting ongoing improvements.[26] Use of the technology may require investments in particular types of plant and equipment. Costly marketing campaigns may be undertaken to create buyer awareness of the use or incorporation of the proprietary technology. Sunk investments like these can give rise to high switching costs that create substantial obstacles to the use of alternative technologies and lead to "lock-in."[27]

In sum, an SSO's endorsement of a proprietary technology as a standard may have economic effects that convert a previously competitive

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[22] Besen & Farrell, *supra* note 20, at 118.

[23] It should be noted that where the proprietary technology is not coextensive with the standard, as when it is only one among several inputs into the production of a standardized product or process, it is possible for network effects to arise in the relevant "goods" market without also affecting the relevant technology market. Network effects can arise in technology markets for a variety of reasons, of course—e.g., more licensees for a given technology means an increased prospect of improvements, stronger incentives for the creation of complementary technology, etc. In some cases, network effects can be so strong that technology alternatives to the one selected as the standard may not remain viable.

[24] *See, e.g.,* SHAPIRO & VARIAN, *supra* note 21, at 103–71. Technology-specific investments, of course, may also be carried out before the selection of the standard.

[25] Of course, when standardization promotes compatibility with complementary products, it serves to that extent to reduce switching costs (by minimizing the extent to which investments in complementary products are lost when switching suppliers). *See, e.g.,* Joseph Kattan, *Market Power in the Presence of an Installed Base,* 62 ANTITRUST L.J. 1 (1993).

[26] Exposure to alternative technology may be made "off limits" to the technical personnel involved because of licensor concerns about protection of know-how and other trade secrets.

[27] The term "lock-in" is also used to refer to the phenomenon of a network market tipping to one product as the result of the demand-side externalities of scale (i.e., network effects) discussed above. *See, e.g.,* CABRAL, *supra* note 20, at 315. In the perhaps unlikely case where the technology adopted as standard is licensed on terms allowing licensees an unfettered right to sublicense to third parties (without paying additional compensation to the original licensor), intra-standard competition may substantially reduce the leeway

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technology market into one that is subject *ex post* to market or monopoly power.[28] Standard selection may thus create or enhance market power in the market for technology licensing. Power in the market for technology will not necessarily be leveraged downstream, but there is at least the possibility that it will be exercised to harm competition in markets for standard-compliant products and services, particularly when such markets themselves are characterized by network effects.[29] Of course, the facts of any given case of standard setting must be analyzed individually as it is entirely possible that after selection, alternative technologies (or even alternative standards) may remain viable substitutes for the standardized technology.[30]

When *ex post* market power is a realistic threat, however, one would expect participants in the standard-setting process (other than self-interested IP holders) to have a strong interest in limiting or preventing the creation and exercise of such power. In the remainder of this article, we discuss and analyze measures that are available to SSOs in order to achieve this very purpose. In particular, we turn next to examining the solicitation of commitments to license intellectual property on reasonable and nondiscriminatory (RAND) terms.

II. "REASONABLE" ROYALTIES IN THE STANDARD-SETTING CONTEXT: APPLICATION OF THE *EX ANTE* AUCTION MODEL

A. REASONABLE ROYALTIES AND THE LAW

If the primary goal of obtaining RAND licensing commitments is to prevent IP holders from setting royalties that exercise market power created by standardization, then the concept of a "reasonable" royalty for purposes of RAND licensing must be defined and implemented by reference to *ex ante* competition, i.e., competition in advance of standard

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for lock-in to arise. *See, e.g.,* Kattan, *supra* note 25, at 12 ("the lock-in effect is of little competitive consequence when consumers are 'locked into' a competitive market").

[28] For the moment, no distinction is drawn between "traditional" market power and the power to exploit individual licensees that arises after the licensees are locked-in by their relationship-specific investments.

[29] *See, e.g.,* ABA SECTION OF ANTITRUST LAW, HANDBOOK ON THE ANTITRUST ASPECTS OF STANDARDS SETTING 99–106 (2004); KNUT BLIND, THE ECONOMICS OF STANDARDS: THEORY, EVIDENCE, POLICY 43–44 (2004); Dennis W. Carlton, *A General Analysis of Exclusionary Conduct and Refusal to Deal—Why Aspen and* Kodak *Are Misguided,* 68 ANTITRUST L.J. 659, 661–71 (2001); Louis Kaplow, *Extension of Monopoly Power Through Leverage,* 85 COLUM. L. REV. 515, 520–39 (1985).

[30] *See, e.g.,* Carl Shapiro, Setting Compatibility Standards: Cooperation or Collusion? (2000) (unpublished manuscript, *available at* http://haas.berkeley.edu/~shapiro/standards.pdf); SHY, *supra* note 20, at 259–61.

selection. Economists have readily embraced this approach,[31] but it does not flow naturally or automatically from the antitrust or patent (or other IP) laws. Neither the antitrust nor the patent laws deem it unreasonable for IP holders to seek to reap the returns that accrue *ex post* from the attainment of lawfully won monopoly or market power.[32] A patent owner is generally entitled under patent law to extract as high a royalty as it can obtain.[33] Antitrust law similarly does not forbid a firm, acting unilaterally, from making use of lawfully obtained monopoly power to negotiate a supracompetitive royalty. That is, as a general matter, Section 2 of the Sherman Act is not violated when a single firm engages in conduct directed at reaping profits from its customers without injuring the process of competition (though sometimes such acts may be remediable by tort or contract law).[34] Thus, the courts have generally rejected

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[31] *See, e.g.*, SHAPIRO & VARIAN, *supra* note 21, at 241 (reasonable royalties are "the royalties that the patent-holder could obtain in open, up-front competition with other technologies, not the royalties that the patent holder can extract once other participants are effectively locked in to use technology covered by the patent"); Joseph Farrell & Carl Shapiro, Intellectual Property, Competition, and Information Technology 30 (Univ. of Cal., Berkeley Competition Policy Center, Working Paper No. CPC04-45, March 2004) (fair and reasonable licensing terms are "normally best measured by adopters' willingness to pay . . . when they know their alternatives and have not yet made investments specific to that technology").

[32] In this section, we assume that the IP holder is not in competition with its customers. We address the case of discriminatory royalties charged to customer-competitors in Part IV below.

[33] *See, e.g.*, Brulotte v. Thys Co., 379 U.S. 29, 33 (1964) ("A patent empowers the owner to exact royalties as high as he can negotiate with the leverage of that monopoly."); W.L. Gore & Assocs. v. Carlisle Corp., 529 F.2d 614, 623 (3d Cir. 1976) ("The general rule is that, absent any overriding unlawful conduct, 'A patent empowers the owner to exact royalties as high as he can negotiate with the leverage of that monopoly.' A royalty demand which is so high as to preclude acceptance of a license offer is, after all, not appreciably different from a refusal to license upon any terms. The right to refuse to license is the essence of the patent holder's right under the patent law which rewards invention disclosure by the grant of a limited monopoly in the exploitation of the invention.") (citations omitted). In the case of infringement, a court must award the patent holder "in no event less than a reasonable royalty," 35 U.S.C. § 284, which is defined by patent law as the amount a willing licensor and licensee would have agreed to had they negotiated a license the day the infringement commenced. *See, e.g.*, Trans-World Mfg. Corp. v. Al Nyman & Sons, Inc., 750 F.2d 1552, 1568 (Fed. Cir. 1984); Panduit Corp. v. Stahlin Bros. Fibre Works, 575 F.2d 1152, 1157–58 (6th Cir. 1978). *But see* Patterson, *supra* note 12 (proposing approach under patent laws distinguishing between demand for a given invention and demand for an associated standard, allocating to the patentee only that remuneration attributable to its own innovative contribution).

[34] *See, e.g.*, Intergraph Corp. v. Intel Corp., 195 F.3d 1346, 1356–60 (Fed. Cir. 1999) (withdrawal of special customer benefits from non-competing customer was not an antitrust violation); Berkey Photo, Inc. v. Eastman Kodak Co., 603 F.2d 263, 294 (2d Cir. 1979) ("If a firm has taken no action to destroy competition it may be unfair to deprive it of the ordinary opportunity to set prices at a profit-maximizing level."); Alaska Air v. United Airlines, 948 F.2d 536, 548–49 (9th Cir. 1991) ("Monopoly leveraging is just one of a number of ways that a monopolist can permissibly benefit from its position. This does

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the notion that it is an antitrust offense for a monopolist to charge a monopoly price, without more.[35] As Judge Posner has put it, "the antitrust laws are not a price-control statute or a public utility or common-carrier rate-regulation statute."[36] To the contrary, as the Supreme Court has recently explained, "[t]he opportunity to charge monopoly prices—at least for a short period—is what attracts 'business acumen' in the first place; it induces risk taking that produces innovation and economic growth."[37]

If antitrust and IP law do not generally supply a basis for limiting royalties charged by IP holders to levels consistent with *ex ante* (rather than *ex post*) market power, then private methods of control must be relied on to attempt to achieve this goal. Of course, private control itself may pose serious antitrust issues. The standardization process typically involves consultation and agreements among firms that are often competing buyers of IP and also may be competing sellers in the downstream product markets. While joint decision making by competitors can sometimes promote the general welfare, it always entails the danger of misbe-

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not mean, however, that such conduct is anticompetitive. Both 'monopoly leveraging' in an adjacent market, and setting high prices in the original 'monopoly' market, represent the cost that we incur when we permit efficient and natural monopolies. The Supreme Court has consistently held that there must be 'predatory' conduct to attain or perpetuate a monopoly for a monopolist to be liable under Section 2.") (citations omitted); Mr. Furniture Warehouse, Inc. v. Barclays American/Commercial Inc., 919 F.2d 1517, 1522 (11th Cir. 1990) ("to constitute a violation the monopolist's activities must tend to cause harm to competition; unrelated harm to an individual competitor or consumer is not sufficient"); Pate, *supra* note 13 ("Bringing a complaint to the Antitrust Division about 'excessive' royalties, without more, is a losing strategy. Antitrust enforcers are not in the business of price control. We protect a competitive process, not a particular result, and particularly not a specific price. In fact, if a monopoly is lawfully obtained, whether derived from IP rights or otherwise, we do not even object to setting a monopoly price.").

[35] *See, e.g.,* Verizon Communications Inc. v. Law Offices of Curtis V. Trinko, LLP, 540 U.S. 398, 407 (2004) ("The mere possession of monopoly power, and the concomitant charging of monopoly prices, is not only not unlawful; it is an important element of the free-market system."); Arroyo-Melecio v. Puerto Rican Am. Ins. Co., 398 F.3d 56, 69 (1st Cir. 2005) ("A monopolist 'is free to exploit whatever market power it may possess when that exploitation takes the form of charging uncompetitive prices.'") (internal quotations and citation omitted); Blue Cross & Blue Shield United v. Marshfield Clinic, 65 F.3d 1406, 1412–13 (7th Cir. 1995) ("A natural monopolist that acquired and maintained its monopoly without excluding competitors by improper means is not guilty of 'monopolizing' in violation of the Sherman Act, and can therefore charge any price that it wants. . . .") (citation omitted); *Berkey Photo,* 603 F.2d at 294 ("setting a high price may be a use of monopoly power, but it is not in itself anticompetitive"); *Alaska Air,* 948 F.2d at 548–49 (same); *In re* Tamoxifen Antitrust Litig., 277 F. Supp. 2d 121, 136-37 (E.D.N.Y. 2003) (no antitrust injury arises from unilateral refusal to license a patent other than at supracompetitive prices).

[36] *Blue Cross,* 65 F.3d at 1413.

[37] *Trinko,* 540 U.S. at 407 (2004) ("To safeguard the incentive to innovate, the possession of monopoly power will not be found unlawful unless it is accompanied by an element of anticompetitive *conduct.*").

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havior for anticompetitive purposes, such as the threat of behavior aimed at collusively *reducing* the price paid for intellectual property.[38] Careful attention must be paid to the risk that the policies and practices adopted by SSOs and the actions taken by participating members in the course of the standard-setting process may yield rewards for innovation that are too low by comparison to the level of incentives normally entailed by the intellectual property laws and accepted by the antitrust laws.

Such considerations rule out defining a reasonable RAND royalty as the royalty that would be observed in the event that the prospective licensees were to band together (either before or after standard selection) and act as a buyers' cartel. The antitrust laws deem collusive conduct by buyers directed at reducing prices through the exercise of monopsony power to be a violation of the per se rule against price fixing.[39] Not all collaborations among potential licensees that touch on royalty determination are necessarily barred under the antitrust laws, however. As a general matter, the antitrust agencies recognize that many buying and procurement collaborations "do not raise antitrust concerns and indeed may be procompetitive. Purchasing collaborations, for example, may enable participants to centralize ordering, to combine warehousing or distribution functions more efficiently, or to achieve other efficiencies."[40] In such cases, the existence of efficiencies flowing from an underlying "efficiency-enhancing integration" of resources supplies a critical ingredient for the avoidance of per se risk.[41]

In the case of the typical SSO, however, the integration and efficiencies needed to justify outright collective bargaining on royalties are in short supply. As Carl Shapiro has explained, "[w]hile the law has typically

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[38] For a comprehensive discussion of antitrust issues arising in the context of private standard-setting activities, *see* HOVENKAMP, JANIS & LEMLEY, *supra* note 17, § 35; ABA SECTION OF ANTITRUST LAW, HANDBOOK ON THE ANTITRUST ASPECTS OF STANDARDS SETTING (2004).

[39] *See, e.g.,* Mandeville Island Farms, Inc. v. Am. Crystal Sugar Co., 334 U.S. 219, 235 (1948) (holding that "it is clear that the agreement [to fix sugar beet prices] is the sort of combination condemned by the Act, even though the price-fixing was by purchasers, and the persons specially injured under the treble damage claim are sellers"); Sony Elecs., Inc. v. Soundview Techs., Inc., 157 F. Supp. 2d 180, 183–88 (D. Conn. 2001) (refusing to dismiss § 1 price-fixing and boycott claims directed at alleged monopsony conspiracy among potential licensees to fix artificially low royalty rates for IP implicated by an SSO standard). The antitrust enforcement agencies have also taken the position that the antitrust laws are violated when SSO members act together to deprive IP holders of royalties by prohibiting the ownership of IP rights in a standard. *See* HOVENKAMP, JANIS & LEMLEY, *supra* note 17, § 35.6c2(B) at 35–51.

[40] U.S. Dep't of Justice & Federal Trade Comm'n, Antitrust Guidelines for Collaborations Among Competitors § 3.31(a) (2000), *available at* http://www.ftc.gov/os/2000/04/ftcdojguidelines.pdf [hereinafter DOJ-FTC Competitor Collaboration Guidelines].

[41] *Id.* § 3.2; *see also* Broadcast Music, Inc. v. CBS, 441 U.S. 1 (1979).

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looked for integration and risk-sharing among collaborators in order to classify cooperation as a joint venture and escape *per se* condemnation, . . . the essence of cooperative standard setting is not the sharing of risks associated with specific investments, or the integration of operations."[42] There is thus considerable risk that an active SSO role in royalty negotiations on behalf of potential licensees (particularly when the potential licensees participating in the standard-setting effort are a significant fraction of all prospective licensees) will not be classified as conduct ancillary to a traditional efficiency-enhancing integration, but instead will be deemed to "create or increase [monopsony] power or facilitate its exercise by increasing the ability or incentive to drive [down] the price of the purchased product."[43]

Current antitrust law may not encourage outright collective bargaining over license terms (at least not in the usual case),[44] but antitrust policy need not frustrate all efforts of SSOs to avoid fostering the creation or facilitating the exercise of *ex post* market power by holders of intellectual property rights in standards they adopt. Economics suggests a model of royalty determination that avoids buyer collusion and monopsony, while reserving a role for standard-setting organizations that promotes effi-

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[42] Shapiro, *supra* note 30.

[43] DOJ-FTC Competitor Collaboration Guidelines, *supra* note 40, § 3.31(a); *but see* Pate, *supra* note 13 ("Some standards development organizations have reported to the Department of Justice that they currently avoid any discussion of actual royalty rates, due in part to fear of antitrust liability. It would be a strange result if antitrust policy is being used to prevent price competition. [Footnote omitted.] There is a possibility of anticompetitive effects from ex ante license fee negotiations, but it seems only reasonable to balance that concern against the inefficiencies of ex post negotiations and licensing hold up."). *See also*, Patterson, *supra* note 12, at 1055–56 ("allow[ing] the standard-setting organization to negotiate a licensing arrangement with the patent holder" involves antitrust risks "because the standard-setting organization could be seen as a vehicle for price-fixing collusion by its members"). Even in cases where the existence of an efficiency-enhancing integration has been apparent in more traditional terms, there remains a threat of expensive and fact-laden rule of reason challenges that may not readily be susceptible to disposition before trial. *See* Addamax Corp. v. Open Software Found., Inc., 888 F. Supp. 274, 283, 285 (D. Mass. 1995) (granting summary judgment on per se but not rule of reason claim of plaintiff whose IP had not been selected by the defendant non-profit industry consortium in its efforts to solicit bids for standardized components of a platform-independent version of the UNIX operating system). Despite the fact that most commentators find the result in *Addamax* problematic, *see* HOVENKAMP, JANIS & LEMLEY, *supra* note 17, § 35.4a2 at 35-27 n.16; Shapiro, *supra* note 30, the defendants were obliged to incur the expense of a trial on the merits. *See* Addamax Corp. v. Open Software Found., 152 F.3d 48 (1st Cir. 1998) (affirming judgment for defendants after trial on causation of damages).

[44] This conclusion is not altered by The Standards Development Organization Advancement Act of 2004, Pub. L. No. 108-237, 118 Stat. 661 (codified at 15 U.S.C. §§ 4301 et seq. and accompanying notes). While the Act provides for rule of reason treatment of a "standards development organization" that engages in a "standard development activity," it exempts from the definition of the latter "[e]ntering into any agreement or conspiracy that would set or restrain prices of any good or service." *Id.* §§ 103–104.

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ciency through a true integration of resources. We turn next to a discussion of this model and its implications.

B. The *Ex Ante* Auction Model for the Control of Market Power

One natural solution to the problem of *ex post* market power is for prospective licensees to negotiate contracts in advance of standard selection, when the market is at its most competitive and proponents of alternative technology are actively vying with each other for advantage. Contracts are often used to constrain the *ex post* economic power that a decision maker bestows upon one among numerous contending parties. In more general terms, economists have explored the nature of competition "for the field" or "for a prize" and the incentives for the contestants involved to compete away the expected *ex post* gains in the effort to gain victory.[45] The theory of franchise bidding and "Demsetz auctions," for example, has explored the opportunity to limit the power of natural monopolies by making the monopoly franchise the "prize" to be won by contesting bidders, with *ex post* pricing and performance constrained to more competitive benchmarks by the terms of the agreed contract.[46] In this context, the "prize" is selection as the standard.

Of course, economics teaches that the efficacy of contracting in controlling market power can vary depending on market structure and the characteristics of market participants. A very broad literature addresses and debates the potential shortcomings of contractual remedies in the presence of real-world phenomena such as transactions costs, imperfect information, and incomplete contracts.[47] If anything, however, the

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[45] Besen & Farrell, *supra* note 20, at 119.

[46] *See, e.g.,* Harold Demsetz, *Why Regulate Utilities?,* 11 J.L. & ECON. 55 (1968); Eduardo Engel, Ronald Fischer & Alexander Galetovic, Competition *in* or *for* the Field: Which Is Better? (Yale Univ. Economic Growth Center, Discussion Paper No. 844, Mar. 2002); W. KIP VISCUSI, JOHN M. VERNON & JOSEPH E. HARRINGTON, JR., ECONOMICS OF REGULATION AND ANTITRUST 395-409 (3d ed. 2000); JEAN-JACQUES LAFFONT & JEAN TIROLE, A THEORY OF INCENTIVES IN PROCUREMENT AND REGULATION ch. 7 (1993). Franchise bidding can theoretically yield pricing below the monopoly level, such as average cost pricing (or even marginal cost pricing if two-part tariffs can be successfully implemented).

[47] *See, e.g.,* Warren S. Grimes, *Market Definition in Franchise Antitrust Claims: Relational Market Power and the Franchisor's Conflict of Interest,* 67 ANTITRUST L.J. 243 (1999); Benjamin Klein, *Market Power in Franchise Cases in the Wake of* Kodak*: Applying Post-Contract Hold-Up Analysis to Vertical Relationships,* 67 ANTITRUST L.J. 283 (1999); Carl Shapiro, *Aftermarkets and Consumer Welfare: Making Sense of* Kodak, 63 ANTITRUST L.J. 483 (1995); Severin Borenstein, Jeffrey MacKie-Mason & Janet Netz, *Antitrust Policy in Aftermarkets,* 63 ANTITRUST L.J. 455 (1995); Joseph Farrell & Carl Shapiro, *Optimal Contracts with Lock-In,* 79 AM. ECON. REV. 51 (1989). Much of this literature is directed at interpreting the Supreme Court's decision in *Eastman Kodak Co. v. Image Technical Services, Inc.,* 504 U.S. 451 (1992), a case vitally concerned with the analysis of *ex ante* vs. *ex post* measurements of market

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markets in which standard setting takes place are more likely than the average case to involve well-informed and experienced participants capable of both performing complex evaluations regarding licensing alternatives and writing sophisticated contracts.

Despite relatively favorable circumstances for effective contracting in the pre-selection phase of standard-setting endeavors, prospective licensors and licensees still may lack sufficient incentives to engage in such activity. Contracting is costly and it may be perfectly rational for any given potential licensee to avoid the costs of negotiating licenses with all (or even any) potential licensors and adopt a wait-and-see attitude pending the resolution of the selection process.[48] Potential licensors may wish to avoid the expense of bidding for and negotiating over the business of potential buyers at a time when selection is uncertain. Consequently, much or all licensing negotiation between individual parties may take place only *after* a standard has been selected.

In such circumstances, SSOs can serve an important and procompetitive function by, in effect, conducting "auctions" of their standards in which IP holders "bid" for favorable standard selections through the submission of RAND commitments coupled with specifically disclosed "model" or "representative" licensing terms.[49] A variety of auction pro-

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power. We are persuaded that a reasonable case can be (and has been) made that an *ex ante* approach to the evaluation (and constraint) of market power is defensible—even when post-contract market power has later arisen—as long as there is: (1) competition at the pre-contact stage, (2) reasonable, though not necessarily complete or perfect, information on the buyer's part, and (3) conduct that is not outside of the (reasonable disclosed) limits imposed by the contract terms. In other words, as Professor Klein explains it, "the reasoning of *Kodak* requires that an actual hold-up take place, not merely that a potential hold-up exists, before throwing out pre-contract competition analysis and using a post-contract definition of market power." Klein, *supra,* at 284.

[48] Particularly if it is assumed that the terms found in licenses executed before standard selection will be relied on post-selection to implement a general RAND commitment, *cf.* Patterson, *supra* note 12, at 1065 (arguing that pre-standardization license terms are the "best estimate" of reasonable royalties), any given potential licensee will have an incentive to rely on the general RAND commitment and "free ride" on the pre-selection license negotiations of others.

[49] *See, e.g.,* Stanley M. Besen, Standard Setting and Intellectual Property: An Outline of the Issues, Statement at the FTC/DOJ Hearings on Competition and Intellectual Property Law and Policy in the Knowledge-Based Economy (Apr. 18, 2002), *available at* http://www.ftc.gov/opp/intellect/020418stanleymbesen.pdf (drawing analogy to "an *auction* held by the producers of the final product in which they award a monopoly to the sponsor of the lowest cost technology but in which they exploit the *ex ante* competition among sponsors to limit the magnitude of the license fee"). It is not even necessary that the SSO make the RAND obligation inescapable in such a process; the SSO need only obligate participants to observe RAND commitments unless and until they expressly and specifically disclaim such undertakings in a public manner (in advance of standard selection). We discuss in Part IV.A below our conclusion that innovators are unlikely to avoid or disclaim RAND obligations (at least when such obligations are interpreted in the manner proposed in this article).

cesses and methods exist as possible models.[50] One option would be to adopt the "sealed-bid" or "Dutch" auction model and accord all candidates the opportunity to submit (simultaneously) "best and final" responses to the SSO's RFP. This auction form is known to offer a number of benefits, obviously pertinent here, such as discouraging tacit collusion and encouraging entry.[51]

We assume that such an auction-like process would involve no collective royalty negotiations with any given putative licensor after its "bid" has been submitted to the SSO (though we would not deem it to violate this assumption if, in appropriate circumstances, bidding were to be reopened on a general basis). We further assume that the operative SSO voting (or other decision-making) process would not be unduly susceptible to being skewed or biased by one or more SSO members, much as many antitrust decisions in the area have effectively required.[52] Finally, we assume that all parties would remain free to contract privately outside the standard-setting process, and that participation by potential licensors would be purely voluntary in the sense that "they can decline to participate in the standard-setting organization altogether, or withdraw from consideration of a particular standard in which they have an interest."[53]

SSO-sponsored auction-like activity in such circumstances would differ materially from per se unlawful collective price negotiation.[54] As a general

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[50] *See, e.g.,* PAUL KLEMPERER, AUCTIONS: THEORY AND PRACTICE (2004).

[51] *Id.* at 114–15. ("In a standard sealed-bid auction (or 'first-price' sealed-bid auction), each bidder simultaneously makes a single 'best and final' offer. As a result, firms are unable to retaliate against bidders who fail to cooperate with them, so collusion is much harder than in an ascending auction. Tacit collusion is particularly difficult since such firms are unable to use the bidding to signal. . . . From the perspective of encouraging entry, the merit of a sealed-bid auction is that the outcome is much less certain than in an ascending auction. . . . It follows that potential entrants are likely to be more willing to enter a sealed-bid than an ascending auction."). *See also* Robert C. Marshall & Michael J. Meurer, *Bidder Collusion and Antitrust Law: Refining the Analysis of Price Fixing to Account for the Special Features of Auction Markets,* 72 ANTITRUST L.J. 83, 85–86, 91–93 (2004); VIJAY KRISHNA, AUCTION THEORY 151–62 (2002); ELMAR WOLFSTETTER, TOPICS IN MICRO-ECONOMICS: INDUSTRIAL ORGANIZATION, AUCTIONS, AND INCENTIVES 209–11 (1999).

[52] *See, e.g.,* James J. Anton & Dennis A. Yao, *Standard-Setting Consortia, Antitrust, and High-Technology Industries,* 64 ANTITRUST L.J. 247, 255–58 (1995) (noting frequency of analysis of decision-making procedures in standard-setting antitrust cases). *Cf.* The Standards Development Organization Advancement Act of 2004, Pub. L. No. 108-237, § 103, 118 Stat. 661 (codified at 15 U.S.C. § 4301) (defining a "standards development organization" eligible for the protections offered by the Act to be one that "us[es] procedures that incorporate the attributes of openness, balance of interests, due process, an appeals process and consensus").

[53] HOVENKAMP, JANIS & LEMLEY, *supra* note 17, § 35.6c2(B) at 35-52.

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matter, of course, auction processes are consistent with independent decision making by potential buyers and sellers, and with efficiency.[55] Antitrust law certainly recognizes the lawfulness of auctions and auction institutions, at least when normal safeguards are observed to protect against collusion.[56] Consistently, we would expect it would not violate the antitrust laws in most instances for an SSO to conduct an appropriately designed auction-like process intended to yield detailed RAND commitments by IP holders, on the basis that such conduct is efficiency-enhancing and ancillary to the underlying "integration" of evaluative and consensus-building resources contributed by participating SSO members and coordinated by the SSO.[57]

To illustrate the operation of the auction model, consider a simplified scenario in which the competing holders of IP (patents, say) offer bids of a license fee per unit of output to downstream users who are choosing which patent should be embodied in a standard. We assume that all investments in R&D by the patent holders already have been sunk and patent holders do not anticipate incurring any future costs as a consequence of licensing their patent. They will not be obligated to incur

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objective summaries or comparisons of offered royalties or other economic terms or to discuss, evaluate, and compare (on an individual, common, or collective basis) the technical merits of competing submissions, though we recognize that it has been said that there is a risk that "antitrust counsel is likely to circumscribe the information exchanges more than is absolutely necessary, particularly because what is necessary for antitrust purposes is not always well defined." Anton & Yao, *supra* note 52, at 264. In this regard, a salutary effect may flow from the provisions of The Standards Development Organization Advancement Act of 2004, Pub. L. No. 108-237, §§ 103–104, 118 Stat. 661 (codified at 15 U.S.C. §§ 4301–4302), which apply rule of reason treatment to a "standards development organization" that engages in a "standard development activity," including "[e]xchanging information among competitors relating to cost, sales, profitability, prices, marketing, or distribution of any product process of service" insofar as the exchange is "reasonably required for the purpose of developing or promulgating a voluntary consensus standard."

[55] Of course, as already noted, some auction forms are better suited than others to deterring tacit collusion. Efficiency properties can also vary with auction method. *See, e.g.,* KLEMPERER, *supra* note 50, at 28–34.

[56] *See, e.g.,* Hudson's Bay Co. Fur Sales, Inc. v. Am. Legend Coop., 651 F. Supp. 819 (D.N.J. 1986) (rejecting antitrust claims against an association of American mink farmers relating to arrangements for auction of mink pelts by a subsidiary of the association). Of course, many cases have addressed alleged collusion to rig bids or sales terms in auction contexts. *See, e.g.,* DeLoach v. Philip Morris Cos., Inc., 1:00CV01235 2001 U.S. Dist. LEXIS 16909 (M.D.N.C. July 24, 2001) (rejecting motion to dismiss antitrust claims where plaintiffs alleged "that Defendants conspired before the auctions to rig bids [so that] . . . the allocation that took place at the auctions allegedly was a result of Defendants' collusion, which preceded standard auction procedure"); *In re* Auction Houses Antitrust Litig., 193 F.R.D. 162 (S.D.N.Y. 2000) (certifying class action based on alleged collusion among auction houses with regard to buyer's premiums and seller's commissions).

[57] *Cf.* HOVENKAMP, JANIS & LEMLEY, *supra* note 17, § 35.6c2(B) at 35–53 ("standard-setting organization rules restricting the exercise of intellectual property rights in a standard should generally be permissible").

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costs for further development, to provide support, or to manage the license contract. To simplify the analysis, we also assume that the choice of patent has no effect on the quality of the downstream product, but does affect the downstream production costs of downstream producers and affects all downstream producers identically. We further assume that many downstream firms use the IP to produce perfect substitutes, but that patent owners do not also produce final products.[58] Let us say that use of the "best" IP option, patent A, would result in downstream production costs of 5 per unit of output (incremental and average costs), that use of B would result in downstream productions costs of 6 per unit, and all other IP choices would result in higher downstream production costs. If all this is known and the patent holders compete to be chosen by offering per unit license fees, the outcome is clear. The holder of patent A will offer a license fee just less than 1 per unit of output and be chosen. Downstream producers that use A and pay a license fee of just less than 1 will have costs just under 6 per unit, lower than if they had used any other patent, even royalty-free.

The simplifying assumption made above that patent holders incur zero recurring costs is highly unrealistic in our view (as discussed further in Part II.C.1, *infra*), but the analysis is easily modified to allow for recurring costs. If we assume, instead, that each putative licensor incurs recurring costs of c per unit of downstream output, then no holder of IP will accept a license fee lower than c. The "best" IP option will be able to command a license fee equal to c plus the difference in value between the best and the next-best alternatives. In our simple example, the difference in value between the best and next-best options was 1 ($= 6 - 5$), which also equaled the license fee with zero licensing costs. If licensing costs instead are c, the best alternative could command a license fee of $c + 1$ because the holder of the next-best alternative would not accept a fee lower than c. As rival IP solutions come closer and closer to being perfect substitutes (in the simple example, converging at a downstream unit cost of 5), the competitive royalty will approach c, the incremental cost of recurring innovation and licensing expenses.

The simple example also can be used to illustrate the particular utility of the *ex ante* auction model in cases where the putative licensor gains the power to exploit licensees because licenses are locked-in by switching costs arising from sunk relationship-specific investments. Once buyers sink relationship-specific investments that increase their costs of switching to alternatives, sellers have an incentive to act opportunistically and "hold-up" buyers by forcing them to accept a higher price or lower

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[58] We discuss the case of IP holders who are downstream competitors in Part III, *infra.*

quality.[59] To illustrate using our example, make the further assumption that each downstream producer must sink investments equivalent to costs of 3 per unit of output in equipment to use any of the IP, but that each patent requires producers to use a somewhat different machine. Once they purchase the machinery used with particular IP, producers must incur an additional cost of 3 per unit to switch to another patent. If a producer purchased machinery to use with the best IP option, A, without a binding (*ex ante*) commitment on A's license fee, A could charge a license fee up to 4 per unit—equal to the switching cost of 3 plus the buyer's saving of 1 in recurring cost from using the best IP— without inducing downstream producers to switch to B. There is a rich literature in economics recognizing that rational buyers will negotiate contracts that seek to prevent such opportunistic hold-ups by regulating the relationship in advance and limiting what the seller is allowed to do.[60]

We would prefer to use the term "market power" to refer to the power to exploit all of the buyers in the pertinent market, and not just some particular buyers who have taken steps that make them particularly vulnerable to exploitation, as when they have locked themselves in by undertaking highly specialized investments. We acknowledge, however, that the term is sometimes applied to the seller's relationship-specific power to exploit locked-in buyers.[61] It bears emphasis, however, that hold-ups can occur in the absence of *any* market power in the narrower or more

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[59] *See, e.g.*, VISCUSI, VERNON & HARRINGTON, *supra* note 46, at 407–09; Klein, *supra* note 47; Shapiro, *supra* note 47; Farrell & Shapiro, *supra* note 47; OLIVER WILLIAMSON, THE ECONOMIC INSTITUTIONS OF CAPITALISM (1985); Timothy J. Muris, *Opportunistic Behavior and the Law of Contracts*, 65 MINN. L. REV. 521 (1981).

[60] *See, e.g.*, Benjamin Klein, *Market Power in Antitrust: Economic Analysis After* Kodak, 3 SUP. CT. ECON. REV. 43, 50–51 (1993); Muris, *supra* note 59.

[61] We agree with the many commentators who have questioned the wisdom of any policy decision that treats the short-run abuse of relationship-specific power as equivalent to the exercise of economic power of the more durable sort held by a monopolist or dominant firm. Where "traditional" market power is lacking, as in the typical franchising or aftermarket case, it seems reasonable for antitrust policy to rely more heavily on the market mechanism to deter or discipline exploitation of locked-in customers, e.g., through the supplier's need to maintain its reputation for fair dealing in order to continue to entice previously uncommitted customers into new relationships. See, *e.g.*, Maris Distrib. Co. v. Anheuser-Busch, Inc., 302 F.3d 1207, 1219 (11th Cir. 2002), *cert. denied*, 537 U.S. 1190 (2003) ("while a party who exercises contract power *may* have market power and *may* violate the antitrust laws under some circumstances, the mere existence and exercise of contract power does not show that a defendant had market power or violated the law. In other words, courts must attempt to ascertain a defendant's economic position in the relevant market, rather than its power pursuant to a particular contract, when considering whether a defendant has market power."); Hack v. President & Fellows of Yale College, 237 F.3d 81, 85 (2d Cir. 2000) ("Economic power derived from contractual arrangements affecting a distinct class of consumers cannot serve as a basis for a monopolization claim.").

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"traditional" sense.[62] Yet in the standard-setting context the *ex post* emergence of "traditional" market power in the technology market can enhance the "hold-up power" flowing from individual lock-in if exercise of the traditional market power increases post-selection switching costs. In other words, protecting against opportunism takes on greater significance in the standard-setting context because an ineffectively constrained licensor may have *ex post* incentives to exploit *both* "traditional" market power and relationship-specific power.

C. ECONOMIC CHARACTERISTICS OF A "REASONABLE" RAND ROYALTY

As a general matter, then, we would deem a royalty to be "reasonable" for RAND commitment purposes—and would correspondingly deem the underlying standard-setting process that generates the royalty to be (to that extent) antitrust compliant—when the royalty is the outcome of an auction-like process appropriately designed to take lawful advantage of the state of competition existing *ex ante* (i.e., in advance of standard selection) between and among the available IP options. We acknowledge, of course, that standards auctions may not always yield results as socially desirable as those of the basic model, particularly if the number of competing IP solutions is very limited and there is incomplete information about the value of each. Yet even when a standard-setting body does not implement an auction procedure, we believe that our basic model supplies an analytical framework and benchmark for what constitutes a reasonable royalty. Economic analysis suggests several characteristics of the "reasonable" RAND royalties that are likely to emerge from *ex ante* competitive auctions.

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[62] *See, e.g.*, Klein, *supra* note 60, at 59 (concepts of monopoly power and opportunism are distinct); Muris, *supra* note 59, at 523 (opportunism is not a problem of precontractual monopoly); Kattan, *supra* note 25, at 10 ("circumstantial" market power associated with contracting problems may exist in many situations not commonly called monopolies); Farrell & Shapiro, *supra* note 47, at 51 ("Even if competition is perfect *ex ante*, once a relationship is established there is some *ex post* bilateral monopoly, which . . . can lead to problems of *opportunism*."). When there appears to be no threat of traditional market power—as when, for example, a standard fails to win acceptance in the marketplace— even acts, such as the use of IP to exploit locked-in customers may be insufficient to justify antitrust remedies. Failed standards can give rise to "last period" problems, when a supplier finds it profitable (even when lacking power in the broader market) to engage in short-term customer exploitation because its short-term gains from holding up its locked-in customers may be greater than the long-term losses from such a policy. *See, e.g.*, Klein, *supra*, at 56–57 & n.28. Lock-in may be a less significant problem in the case of failed standards, however, if the technology market is subject to network effects, as the costs of switching to an alternative—and widely adopted—standard may be trivial or may even be outweighed by the benefits.

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(1) *Non-Zero Royalties.* First, we would not expect "reasonable" royalties to be equal to zero. That is, we would not expect a RAND obligation to be interpreted to require "royalty free" licensing.[63] This may seem slightly surprising in view of what may be deemed the conventional textbook view regarding the social inefficiency of charging positive royalties for the licensing of intellectual property. On this view, once an innovation has emerged from the R&D process, if there is no further improvement, the cost of the IP is entirely sunk, a piece of ancient history, which in the purely theoretical model should be irrelevant for current and future pricing. *Ex post*, economists recognize, the incremental cost to society of an IP license is zero (excluding trivial transactions costs) and this is equally true of total or average cost. The royalty is, therefore, simply a transfer payment from the point of view of society; positive royalties thus provide the IP owner with marginal revenue that exceeds society's marginal cost and thereby lead to underutilization of the IP. Many final-product suppliers who could make good use of it and offer consumers cheaper and better outputs in greater quantities are deterred from doing so by the nonzero price.[64]

In contrast with the standard (and static) textbook view, a more realistic picture recognizes that licensing often obligates the licensor to bear a plethora of ongoing incremental costs. For example, transactions costs may not be quite so inconsequential as often assumed in theory. The licensing of IP, in addition to involving costs of negotiation, contracting, accounting, monitoring, and auditing, also frequently involves the costs of instruction, training, and 24-hour assistance. More significantly, in the modern economy R&D outlays in a product are not a once-and-for-all matter. Fortunately for society, competing firms force one another constantly to engage in substantial R&D expenditures to keep upgrading their products.[65] The license fee must contribute to coverage of this constant stream of costs and offer a profit incentive—a "normal" return on recurring investment in innovation—for the firms to undertake the expenditures. In such industries, the firm's pricing and investment considerations must always be *ex ante*, never *ex post*. And in such circumstances nonzero license fees (or their equivalent in some other form of payment) are needed to provide the incentives to elicit the continuing investment

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[63] *See also* discussion of royalty-free licensing *infra* Part III.H.

[64] Here, we are addressing the standard *static* textbook view (concededly something of a straw man), which disregards the dynamic benefits when superior technology earns rents and provides incentives for future innovative activity. Our point in this section is that we would expect reasonable fees to exceed zero even when there are equally good alternatives *ex ante.*

[65] *See* WILLIAM J. BAUMOL, THE FREE-MARKET INNOVATION MACHINE: ANALYZING THE GROWTH MIRACLE OF CAPITALISM (2002).

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in IP called for by the public interest, and efficient resource allocation requires this fee to enter the *marginal* payment incurred by the licensee. Even license fees determined in an *ex ante* auction process must equal or exceed this level.

(2) *Relation to Cost.* Second, we would expect the relationship between a "reasonable" royalty rate and the incremental cost of recurring innovation and licensing (inclusively defined, as discussed above) to depend directly on the extent or degree of *ex ante* competition. Our numerical illustration of the auction process in Part II.B, *supra,* makes the simplifying (but highly unrealistic) assumption that all investments in R&D by the patent holders had already been sunk, that no ongoing or future innovative activities were anticipated as part of the business, and that there were no other costs of licensing. Once these assumptions are relaxed, as invariably they must be, these recurring incremental costs of innovation and licensing place a floor under the royalty that will result from an *ex ante* competitive auction process. As we have already noted, the "best" IP option will be able to command a license fee equal to incremental cost plus the difference in value between the best and the next-best alternatives. The greater the number of technologies that compete in advance of standard selection and the closer their IP solutions are to being perfect substitutes (so that the difference in value among alternatives approaches zero), the more likely a reasonable royalty will approach incremental cost. We would not expect a reasonable royalty to be supracompetitive (by materially exceeding incremental cost plus a normal return on recurring investment) except when an IP holder possesses market power *ex ante* (e.g., when no or few significant substitutes exist for the innovation the IP holder has created).

(3) *Differential Pricing.* Third, we would not expect that "reasonable" royalties would invariably be uniform and identical across all fields of use, territories, and customers. The difference in value between the best and next-best IP often may vary among users of the IP and, thus, so may the reasonable royalty. Nor should this be seen as necessarily undesirable. Economic analysis shows that differential pricing is often unavoidable for suppliers as a matter of minimal financial viability, and is a common feature of competitive markets, including markets for intellectual property.[66] Indeed, the inherent nature of intellectual property tends to

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[66] *See, e.g.,* William J. Baumol & Daniel G. Swanson, *The New Economy and Ubiquitous Competitive Price Discrimination: Identifying Defensible Criteria of Market Power,* 70 ANTITRUST L.J. 661 (2003); Benjamin Klein & John Shepard Wiley, Jr., *Competitive Price Discrimination as an Antitrust Justification for Intellectual Property Refusals to Deal,* 70 ANTITRUST L.J. 599 (2003); Richard T. Rapp & Lauren J. Stiroh, Standard Setting and Market Power, Statement at the FTC/DOJ Hearings on Competition and Intellectual Property Law and Policy

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facilitate the practice of customer selection and the prevention of arbitrage, factors that make price discrimination feasible.[67] Differential pricing of IP licenses for different fields of use is quite common, for example. Of course, countervailing forces that impede the practicability of discrimination may also operate in the standard-setting context—particularly, transparency in the auction and selection process—with the net effect varying from case to case. Nonetheless, there is no reason to suppose that uniform pricing will inevitably ensue.

The preceding, abstract observations provide only limited guidance in applying the RAND concept in the messy circumstances of concrete disputes. Nonetheless, the analysis presented here is quite powerful as a roadmap to a method both for defining and determining the level of a reasonable RAND royalty. Indeed, there is simply no excuse for a RAND commitment to amount to little more than an empty promise or a pious platitude. So long as SSOs structure the standard selection process appropriately to elicit up-front competition in the submission of particularized licensing terms, the question of what a "reasonable" royalty is amounts to a straightforward matter of direct comparison to the terms submitted before standard selection.

A recent case, *Townshend v. Rockwell International Corp.,*[68] can be read to illustrate some of the principles discussed above. In relevant part, the case involved an antitrust claim against an IP holder for allegedly refusing to license its technology on reasonable terms after prevailing upon an SSO to adopt a standard incorporating the IP. The district court rejected this claim on several grounds. While the court may have somewhat hastily rejected the plaintiff's argument that the industry standard conferred market power on the incorporated patent,[69] it plainly found no basis for an allegation of *ex ante* power in view of the plaintiff's improper reliance on the mere existence of the patent and its failure to allege any dominant

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in the Knowledge-Based Economy (Apr. 18, 2002), *available at* http://www.ftc.gov/opp/intellect/020418rappstiroh.pdf.

[67] *See, e.g.,* HOVENKAMP, JANIS & LEMLEY, *supra* note 17, § 4.3e at 4-57 ("Discrimination in patent licensing may be more common than in the case of ordinary contracts because the licensor is able to engage in customer selection and perhaps to prevent arbitrage within the patent licensing process."). We speak here only of literal discrimination, leaving for Part III, *infra,* a discussion of when and under what circumstances discrimination is likely to be anticompetitive.

[68] 2000-1 Trade Cas. (CCH) ¶ 72,890 (N.D. Cal. 2000).

[69] The court erroneously reasoned that the "adoption of a [sic] industry standard incorporating . . . proprietary technology does not confer any power to exclude that exceeds the exclusionary power to which a patent holder is otherwise legally entitled." 2000-1 Trade Cas. (CCH) ¶ 72,890 at 87,636. It was noted, however, that the antitrust plaintiff had not alleged that the industry standard prevented the development of competing proprietary technology.

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market share in the technology market.[70] Independent of this finding, the court rejected the *ex post* licensing challenge on the ground that there was no allegation that the IP holder had refused to license the antitrust plaintiff in accordance with the proposed licensing terms and conditions that had been submitted to the SSO and its members before the standard was adopted.[71] In effect, the court was rejecting the antitrust plaintiff's hold-up claim in deference to the SSO's ability to protect potential licensees by properly structuring the selection process to elicit reasonably competitive license terms.

III. NONDISCRIMINATORY ROYALTIES IN THE STANDARD-SETTING CONTEXT: THE ROLE OF ECPR

A. THE RATIONALE FOR CONTROLLING AND THE MEANS FOR IDENTIFYING DISCRIMINATORY ROYALTIES

We suggest in the preceding section that a RAND commitment to "reasonableness" may (and should) be given meaning relative to the benchmark of *ex ante* competition. A RAND commitment, however, involves an obligation not just of reasonableness in licensing but of "nondiscrimination" as well. This, in turn, raises two critical issues: (1) why and to what extent is it important to avoid discrimination and (2) how can injurious discrimination be recognized and prevented?

Turning to the first issue, we see no rationale for treating all manifestations of discrimination as equally injurious or, indeed, for treating discrimination as always and necessarily injurious. We have already noted that royalties that are "reasonable" for RAND purposes may be literally discriminatory given that such discrimination can be consistent with (and often can be compelled by) the existence of competition.[72] Economic analysis also shows that price discrimination often benefits many

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[70] *Id.* at 87,636–37.

[71] *Id.* at 87,633–34 & 87,636. The Court observed that the adoption of the standard by the SSO "suggests that the [SSO] was satisfied that the proposed terms submitted by [defendant] evidenced a willingness by the [defendant] to negotiate non-discriminatory, fair, and reasonable terms." *Id.* at 87,633. Patterson argues the court was "incorrect" to think that the "absence of any royalty increase after the adoption of the standard was evidence of the reasonableness of the terms" on the ground (Patterson contends) that the licensing proposal had been submitted to the SSO "in anticipation of standardization." *See* Patterson, *supra* note 12, at 1066. This criticism is unpersuasive, however, as there is no indication that the proposal in question was submitted *after* the pertinent time (i.e., after standard selection by the SSO). As previously discussed, a pre-standard-selection proposal (in the form of model terms or otherwise) will normally be subject to the pressures of *ex ante* competition save for the case where a putative licensor "anticipates" selection because of the lack of any viable alternatives—but then *ex ante* competition is absent and the licensor is guaranteed a monopoly-level royalty in any event.

[72] *See supra* Part II.C.3.

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consumers and sometimes even all of them.[73] In fact, economic theory teaches that the license fees that may be deemed to serve the general welfare most effectively in the case of a monopoly licensor are the systematically discriminatory fees supplied by the so-called Ramsey pricing formula.[74]

There is a subset of cases, however, where *potentially* valid reasons exist for concern about discrimination in license fees for intellectual property: those instances when the owner of the IP uses it as an input in a downstream market where competitors also require the IP for the same purpose. A licensor exercising bottleneck market power that discriminates in licensing in order to handicap its competitors and favor its own downstream sales can create or enhance market power in downstream markets for standard-compliant products and services.[75] By contrast, a pure licensor (even one with monopoly power) will ordinarily lack anticompetitive reasons for engaging in discrimination.[76] As one leading

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[73] *See, e.g.,* Klein & Wiley, *supra* note 66, at 611–19; Rapp & Stiroh, *supra* note 66.

[74] Named after its discoverer, the young Cambridge mathematician-philosopher, Frank Ramsey. *See* Frank Ramsey, *A Contribution to the Theory of Taxation,* 37 ECON. J. 47 (1937). In the simplest case the theorem calls for prices that satisfy the "inverse-elasticity formula" in which the socially optimal price to a customer is selected to deviate from the product's marginal cost in inverse proportion to the customer's elasticity of demand for the product, and by an amount just sufficient to compensate the supplier appropriately in the aggregate. The prices yielded by this theoretically ideal formula are systematically discriminatory, entailing relatively high license fees for users of the IP whose demand elasticity is low and who are therefore the most vulnerable to high charges, and lower fees to users with higher demand elasticities who generally have fairly good alternatives available to them at affordable prices.

[75] In somewhat analogous cases, the "price squeeze" doctrine has been applied under Section 2 where it has been alleged that a vertically integrated monopolist has set its wholesale prices or rates so high that its customers cannot compete with it in the downstream market. *See* Town of Concord v. Boston Edison Co., 915 F.2d 17, 18 (1st Cir. 1990). The seminal price squeeze case is United States v. Aluminum Co. of Am., 148 F.2d 416, 437–38 (2d Cir. 1945) (L. Hand, J.), which concerned the acts of Alcoa, a monopolist in the production of aluminum ingot, in selling to independent fabricators, some of which turned the ingot into sheet aluminum in competition with Alcoa. Judge Hand concluded that because Alcoa set the ingot price "higher than a 'fair price,'" and because its sheet price was so low that its competitors could not match the price and still make a "living profit," there was a violation of § 2. Later cases have dispensed with the "fair price" test in favor of alternative tests, such as the transfer price test (evaluating whether the defendant could have earned a profit if assumed to purchase the monopoly input at the prices charged to its downstream competitors), and the comparative rate of return test (examining downstream profit margins and their relation to upstream profit margins on sales to downstream competitors). *See, e.g.,* Ray v. Indiana & Mich. Elec. Co., 606 F. Supp. 757, 776–77 (N.D. Ind. 1984), *aff'd,* 758 F.2d 1148 (7th Cir. 1985).

[76] This does not mean that discrimination in pricing can have no downstream impact when a licensor is not vertically integrated. If lower input prices are charged to downstream firm A than to its competitor B, that can constitute a competitive disadvantage that even threatens B's continued existence, just because B is more vulnerable to the extraction of 32high payments from it. One might even argue that that such discriminatory pricing, if not precisely adjusted to differences in the cost of providing the IP to the two competing

treatise observes, "[t]he only plausible anticompetitive explanation for [discriminatory license pricing] is as an act of foreclosure by a vertically integrated monopolist."[77] We suggest that this possibility is (or should be taken to be) the principal justification for the RAND nondiscrimination requirement.

Legal practice is consistent with our suggestion. The courts have generally rejected the notion that it is a violation of law, without more, when licensees are charged differential royalties, even when the licensor is a true monopolist. Under the patent laws, for example, patent holders are generally permitted to seek to maximize their income by charging different royalties to different licensees.[78] Similarly, the discriminatory pricing of licenses does not violate antitrust law in and of itself.[79] Colorable claims of antitrust violations involving discriminatory pricing, rare as a general matter, require something more: plausible allegations of adverse effects on *competition*.[80] Accordingly, in this article we interpret the "nondiscrimination" component of the RAND obligation as applying to and regulating the licensing conduct of vertically integrated—but not pure—licensors for the purpose of preventing anticompetitive acts in the market for downstream products and services.

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firms (which often may be negligible), threatens to produce anticompetitive results. But a rational purpose for seeking such effects is normally lacking when the licensor is not a downstream supplier; to the contrary, seeking such effects would be anomalous as a licensor generally will have no incentive to exclude a customer that is less efficient than its rivals. This is not to claim that there are no circumstances where it may be rational for a monopoly supplier that is not integrated downstream to refuse to deal with or otherwise discriminate against downstream customers in order to maintain its upstream monopoly secure against attack by upstart rivals (*see* Carlton, *supra* note 29, at 666–71), but there is no reason to believe that these circumstances are very common.

[77] HOVENKAMP, JANIS & LEMLEY, *supra* note 17, § 13.5c at 13-53.

[78] *See* USM Corp. v. SPS Techs., Inc., 694 F.2d 505, 512 (7th Cir. 1982); HOVENKAMP, JANIS & LEMLEY, *supra* note 17, § 3.3b7 at 3-34–3-35.

[79] *See, e.g.*, Blue Cross & Blue Shield United v. Marshfield Clinic, 65 F.3d 1406, 1412–13 (7th Cir. 1995) ("the firm could have charged whatever prices it wanted, including prices that discriminated against some of the users (monopolists frequently price discriminate), because the antitrust laws do not regulate the prices of natural monopolists. A natural monopolist that acquired and maintained its monopoly without excluding competitors by improper means is not guilty of 'monopolizing' in violation of the Sherman Act, and can therefore charge any price that it wants.") (citation omitted); HERBERT HOVENKAMP, FEDERAL ANTITRUST POLICY 570 (2d ed. 1999) ("As a general matter, a monopolist may lawfully set its profit-maximizing price, and price discrimination is not itself an 'exclusionary' practice.").

[80] *See, e.g.*, HOVENKAMP, JANIS & LEMLEY, *supra* note 17, § 13.5c at 13-52 ("There are a few cases . . . which allege that a discriminatory price in an intellectual property license is illegal not in and of itself, but rather because it facilitates the exclusion of disfavored competitors and therefore helps to maintain a monopoly."); 2 ABA SECTION OF ANTITRUST LAW, ANTITRUST LAW DEVELOPMENTS 1061 (5th ed. 2002) [hereinafter ANTITRUST LAW DEVELOPMENTS] ("in order to demonstrate that a differential royalty licensing regime violates Section 2, the challenger must demonstrate an adverse effect on competition").

Of course, it should be apparent that the principal line of defense against discriminatory fees that are potentially *anticompetitive* in the downstream market is the promotion of *ex ante* competition in the licensing market and the generation of competitively *reasonable* (even if sometimes literally discriminatory) royalties. We acknowledge, however, that this line of defense may be insufficient. IP holders may possess market power *before* the standard setting exercise begins, so that even an SSO-facilitated standards auction will not create competition. Alternatively, even when *ex ante* competition is thriving, an SSO may fail to capitalize effectively on it (e.g., by not creating auction-like conditions), so that there are no precise or administrable limits on reasonableness in the first instance. These considerations lead us to our second critical issue—the question of what principles should be used to identify "discriminatory" royalties for RAND purposes.

As we have already discussed, a purely literal approach to defining discrimination would be overbroad.[81] The primary issue of concern in interpreting RAND commitments of nondiscrimination arises where the patent holder (for example) is licensing to a horizontal competitor in the product or service that uses the patented technology. The RAND criterion is most difficult to define in such cases because, while the fee charged to the licensee may be easy to observe, the fee that the licensor, in effect, charges to itself, is neither directly observable, nor even easily defined. Yet, it is clear that an implicit fee paid by the licensee to itself that is materially lower than that charged to its competitors can undermine the ability of the latter to compete.[82]

There are two immediate questions here. The first and most obvious is how can one impart substance to that apparently nebulous concept, "the fee that the IP proprietor charges itself?" Second, if one can find a way of evaluating that fee and expect the owner of the IP to charge that fee to licensees, can we also expect that fee to be compensatory to the IP holder? From the legal point of view, can such a fee be deemed

[81] A literal approach is taken under § 2(a) of the Robinson-Patman Act, which defines discrimination as "merely a price difference." *See* FTC v. Anheuser-Busch, Inc., 363 U.S. 536, 549 (1960). The Robinson-Patman Act, however, does not apply to intellectual property licensing as such because only transactions in commodities come within its purview. *See* HOVENKAMP, JANIS & LEMLEY, *supra* note 17, § 13.5c at 13-51; 2 ANTITRUST LAW DEVELOPMENTS, *supra* note 80, at 1061.

[82] *Cf.* U.S. Dep't of Justice Antitrust Division, Policy Guide to Merger Remedies, § III.E.2.b at 24 (2004), *available at* http://www.usdoj.gov/atr/public/guidelines/205108.pdf ("if the upstream and downstream firms have merged in such a manner that the sales price to the acquired downstream firm becomes a mere internal accounting factor, the upstream firm could set a high, non-discriminatory price to downstream firms that would nonetheless disadvantage the acquired downstream firm's competitors. A fair dealing provision might then be ineffective.").

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to constitute an improper taking? From the point of view of the social welfare, will the fee constitute an appropriate incentive for innovative activity?

Efficiency considerations enter the matter directly. Too high a license fee is clearly a handicap to more efficient competitors of the IP holder, whereas too low a fee is a relative (competitive) disadvantage to the IP owner, no matter which of them is the more efficient supplier of the remainder of the final-product manufacturing process.[83] The issue, then, is whether a pricing rule exists that prevents these types of inefficiencies, either of which might increase the social costs of the use of inventions.

An apparent solution would be to require all users, including the technology owner, to pay the same license fee. Reality, however, does not provide such an easy way to prevent discrimination among final-product suppliers that unequally affects their ability to compete. For, as just noted, the price that the patent holder *really* charges itself for use of the invention as an input is far from clear. A price may be specified in the firm's accounting records, but that is generally an artificial and arbitrary number that tells us nothing about what the owner really gives up financially (that is, what the firm really pays) when it supplies that invention input to itself. After all, a rise in that accounting price merely moves money from one of the firm's pockets to another. It is necessary to search further to determine what price the patent holder is really paying for the invention input it provides to itself.

The literature on economic regulation provides a way to deal with these questions and give substance to the RAND criterion of nondiscrimi-nation. We derive a principle for determining license fees based on the "efficient component pricing rule" (ECPR) that will be shown to be both necessary and sufficient for a license fee to be competitively neutral in downstream markets and, therefore, at least on that basis, a necessary condition for that fee to be nondiscriminatory. That is to say, *any license fee that substantially departs from the ECPR level can be deemed to violate the RAND requirement of nondiscrimination.* We will show also that the ECPR fee can, indeed, be considered to be what the IP owner implicitly charges itself for use of the property, and that such a fee can be deemed fully compensatory.[84]

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[83] In particular, if the license price is not sufficient to enable the innovator to cover its recurring outlays, that price will clearly constitute a subsidy from the innovator to the licensee.

[84] What cannot be claimed for ECPR, however, is that it prevents any excessive earnings by the IP holder that derive from the control of bottleneck IP. As previously discussed, pre-selection evidence of value in the presence of *ex ante* competition can be used to cap at a "reasonable" level the royalty charged for such IP.

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We recognize that, even if these conclusions are accepted, it may not follow that the courts should undertake enforcement of this or any related standard. The courts quite appropriately resist assuming the supervisory role of a regulatory agency, and particularly so when it comes to the issue of price setting.[85] Still, especially in circumstances where it is alleged that differential pricing is anticompetitive in the downstream market, ECPR can provide guidance in determining whether the fees at issue do or do not satisfy a RAND commitment to avoid discrimination. At a minimum, compliance with ECPR should constitute a "safe harbor" that suffices to disprove an allegation of anticompetitive discrimination (even if noncompliance need not be taken as conclusive evidence of anticompetitive conduct).

B. THE PARITY PRINCIPLE FORMULA FOR ACCESS PRICING: THE LICENSE FEE AN IP PROPRIETOR IMPLICITLY CHARGES ITSELF

The economics of price regulation provides a pricing principle that can be used to determine an efficient, nondiscriminatory licensing fee for technology. This principle has been referred to as the *efficient component-pricing rule* (ECPR) or as the *parity principle*.[86] Despite its distinctive nomenclature, the rule is merely a variant of familiar elementary principles for efficiency in pricing. The parity principle tells us that the price that the IP-holder firm charges itself for the use of its own innovation input equals the price the firm charges customers for a final product using that IP, minus the incremental cost[87] to the IP-holding firm of all other inputs, including capital, used to produce the final product. The parity principle tells us that this is the price that the monopoly owner of any bottleneck input (such as a patent or other IP) that is indispensable to

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[85] *See, e.g.,* Verizon Communications Inc. v. Law Offices of Curtis V. Trinko, LLP, 540 U.S. 398, 408 (2004) (antitrust courts are "ill-suited" to "act as central planners, identifying the proper price, quantity, and other terms of dealing"). One of the virtues of the *ex ante* auction-based approach to the determination of reasonableness for RAND purposes is that it generates objective data that can be directly consulted by a court or other decision maker.

[86] The discussion here draws heavily on William J. Baumol & J. Gregory Sidak, *The Pricing of Inputs Sold to Competitors,* 11 YALE J. ON REG. 171 (1994), and William J. Baumol & J. Gregory Sidak, *The Pricing of Inputs Sold to Competitors: Rejoinder and Epilogue,* 12 YALE J. ON REG. 177 (1995). The basic approach was contributed by Robert D. Willig, *Customer Equity and Local Measured Service, in* PERSPECTIVES ON LOCAL MEASURED SERVICE 71 (Joseph A. Baude et al. eds., 1979).

[87] The term "incremental cost," though widely used in regulatory arenas, is less familiar to economists. It refers to the addition to a supplier's total cost that results from any given addition to the output of one of its products. Thus, it is analogous to marginal cost but is often used to refer to larger increments in output. It may be used to refer to the incremental cost of an entire product; that is, if the firm is producing x units of good X and a number of other products, it refers to the amount that supply of these x units adds to the firm's total outlays.

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the activities of all the final-product competitors implicitly charges itself for that bottleneck input. It is, consequently, the price at which the competing final-product providers should be entitled to purchase the bottleneck input.

Proving that this principle yields the implicit price the licensor charges itself is not difficult. Because we cannot directly observe the fee that the licensor is charging itself, we need an alternative test, with observable components, to determine whether or not a licensor that sets such a license fee is charging others the same fee that it pays itself. Such a substitute test is provided by the following observation. If, and only if, two independent producers of a commodity pay the same license fee for the technology they employ, the difference between the prices at which the two firms can afford to sell a unit of the final product profitably will be exactly equal to the difference between the costs of their remaining inputs. If the remaining input cost of the competitor is X cents lower per unit of final-product output than the cost of other inputs to the IP owner, and the rival can afford to provide the final product exactly X cents more cheaply than the IP owner, then both of them must be paying the same fee for use of the IP. Alternatively, if the costs of other inputs are the same for both firms, a license fee set by the parity principle will allow them to sell the final product at the same price.

C. DERIVATION OF THE PARITY-PRICING (ECPR) LICENSE FEE

All of this can be described formally, giving explicit formulas for an efficient, nondiscriminatory license fee. We use the following notation:

$P_{f,i}$ = the price charged by the IP owner, I, per unit of final product;

$\min P_{f,c}$ = the minimum price per unit for the final product at which production by a competitor, C, is viable;

P_i = the price I charges per unit of final product for a license to use the IP;

$IC_{r,i}$ = the incremental cost per unit of final product to the IP owner I of the inputs other than IP it uses to produce the final product;

$IC_{r,c}$ = the corresponding incremental cost of other inputs for the competitor;

IC_i = any direct incremental cost (per unit of final product) the IP owner incurs to use the IP itself or to license it to others.[88]

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[88] This cost may vary depending on who uses the IP. For example, if the personnel of the owner of the invention learned how to use it during the development process and require no further instruction, while licensees need training for its use, the incremental cost of use by the two types of firm will clearly differ. In such cases, the parity-price formula must be modified in a straightforward way, with the prices to different users of the invention differing by the variation in the cost to the IP owner of their usage.

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We assume here that final products of the IP owner and licensees are perfect substitutes (but explore the consequences of relaxing this assumption in Part III.J, *infra*). As demonstrated below, the efficient component pricing rule requires that the licensing price satisfy either (and hence both) of two equivalent rules. The first is expressed in the formula:

(1) $P_i = P_{f,i} - IC_{r,i}$ *[license price = the IP owner's final-product price − the IP owner's incremental cost of remaining inputs].*

Alternatively, the ECPR price of the bottleneck input must satisfy:

(2) $P_i = IC_i$ + *the IP owner's incremental opportunity cost of licensing to others* = IC_i + *the IP owner's profit per unit of final-product output.*

Equations (1) and (2) are equivalent, as will be shown.

Equation (1) tells us that the ECPR establishes a tight link between the price, $P_{f,i}$, that the IP owner charges for its final product and the price, P_i, it charges its rivals for the license to use the IP. If incremental production costs do not change, efficiency requires that an increase in the per unit price the IP holder charges either for its final good or to its licensees must be matched dollar for dollar by a rise in the other. Equation (2) tells us that the efficient price of the license is the direct incremental cost to the owner of the IP resulting from use of the invention by others, plus the associated incremental opportunity cost. This opportunity cost is the IP holder's loss of profit from the final product that results when IP is licensed to a rival that takes final-product business away from the licensor.[89] Standard economic analysis tells us that this is the way access to IP would be priced in a perfectly competitive market and that it is a proper way to price: the price should equal marginal (incremental) cost including marginal (incremental) opportunity cost— so that, at least at first, this result should not be surprising.[90]

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[89] Because we assume here that final products produced by the IP owner and by rivals are perfect substitutes, sales of final product by rivals will displace unit for unit sales by the IP owner. Note that the relevant opportunity cost here is *average* profit forgone—the total profit forgone by the IP holder as a result of the transaction, per unit of final product sold. It is not the *marginal* opportunity cost, which is likely to be zero because a profit-maximizing IP holder that produces the final product in which the innovation in question is used will produce the quantity of final product at which marginal profit falls to zero.

[90] The opportunity cost element of this result is the focus of current debate over use of ECPR in the regulation of firms deemed to possess monopoly power. *See, e.g.,* Ingo Vogelsang, *Price Regulation of Access to Telecommunications Networks,* 41 J. ECON. LIT. 830, 834 (2003). The problem is that a bottleneck owner is, by definition of a bottleneck, a monopolist, and its final product price may, therefore, be set at a level that yields monopoly profits. These monopoly profits are among the profits forgone as a result of a lost sale of final product. Consequently, they constitute a part of the opportunity cost for which, according to (2) (at least without further modification of the ECPR regime), the bottleneck

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The remaining task is to prove the following proposition:

The "Level-Playing-Field" Theorem. The parity or ECPR price given by (1) or (2) for use of a bottleneck input, such as a legally protected innovation, is both necessary and sufficient in order for the "playing field" to be level. We define a level playing field as conditions that allow the maximum difference between the remunerative prices of the perfect-substitute final-products of the two firms, the IP owner (I) and its final product competitor (C), to be exactly equal to any differences in the firms' remaining incremental costs (other than the license fees).

Proof: The level playing field is defined by

(3) $\min P_{f,c} - P_{f,i} = IC_{r,c} - IC_{r,i}$.

That is, the lowest compensatory price the competitor can afford to charge for the final product should differ from the IP owner's by exactly the amount (positive or negative) that the competitor's remaining costs are below the IP owner's. But the lowest price that is financially viable for the competitor clearly is given by

(4) $\min P_{f,c} = P_i + IC_{r,c}$.

The competitor's price must cover the IP licensing cost plus its costs of all other inputs used to supply the final product (which of course includes the cost of the required capital, made up of economic depreciation and a normal competitive return on that capital).

Comparing these two equations, we see at once that the level playing field condition (3) will be satisfied if, and only if,

(5) $P_i = P_{f,i} - IC_{r,i}$.

But this is the parity-pricing formula (1). Thus, parity pricing is both necessary and sufficient for a level playing field. Q.E.D.

The parity-pricing formula (1 or 5) is also identical to the opportunity-cost variant of the rule, (2), because when final products are perfect substitutes, by definition,

(6) $P_{f,i} = IC_i + IC_{r,i} +$ I's profit per unit of final-product output,

or, by (5),

(7) $P_i = P_{f,i} - IC_{r,i} = IC_i +$ I's profit per unit of final-product output.

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owner should be compensated when it sells bottleneck input to a rival. But what constitutes monopoly profit in the case of bottleneck inputs is normally to be interpreted as an incentive for innovation protected by the intellectual property laws in the case where the bottleneck is IP that is constituted by an innovation.

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This is the parity-pricing formula (2).

This completes the proof that parity pricing of an IP license is a necessary and sufficient condition for a competitively neutral license fee that satisfies the nondiscrimination component of a RAND commitment. It also follows that ECPR is necessary for economic efficiency in the provision of a final product by competing suppliers. If this rule is violated, a less efficient supplier of the remaining inputs can win the competition for the business of supplying those inputs from a more efficient rival. Violation of (1) or (2) permits a less efficient supplier of non-bottleneck inputs to underprice its more efficient competitors. The proof is readily extended to cases with three or more competing firms.

The final conclusion from all this is that, whatever the procedures and circumstances attending the licensing of IP, whether on the basis of an individual license or cross-license, or via a formalized patent pool,[91] or some other means, compliance with ECPR is a sufficient basis for the license fees in question to be deemed to satisfy the nondiscrimination component of a RAND stipulation when the licensor participates in the downstream market.

D. ECPR AND DIFFERENTIAL PRICING OF FINAL PRODUCTS

ECPR formula (1) may be used to determine nondiscriminatory licensing fees even when the licensor does not set a uniform price for final products that use the pertinent IP as an input. The formula may even be used when the licensor's price for the final product is cross-subsidized by other items in the product line of the licensing firm.

In such cases, nondiscriminatory license fees must be derived by strictly applying the basic ECPR formula (1). The licensor's implicit payment to itself for IP varies when it sells the final product at varying prices.

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[91] In some cases, practice of a standard may require access to a pool of rights. To the extent that downstream competitors are members of the pool and use the pooled rights in such competition, ECPR requires that those pooled rights be licensed at a royalty rate derived by reference to the member with the lowest incremental cost of remaining (non-pool-IP) inputs. In some instances, however, pool members are granted the use of pool rights on a royalty-free basis. *See* Josh Lerner, Marcin Strojwas & Jean Tirole, Cooperative Marketing Agreements Between Competitors: Evidence from Patent Pools (Harvard Bus. Sch. Negotiations, Orgs., and Mkts. Research Paper No. 03-25, Apr. 27, 2003). While it may sometimes seem appropriate for IP holders faced by mutually blocking IP rights to agree to mutual forgiveness of license fees (via cross-licensing, patent pooling, or the like) on the assumption that the amounts that the participants owe to one another will approximately cancel one another out, free access to IP is incompatible with ECPR and economic efficiency because with a zero *marginal* access cost too large a share of the use of the IP will tend to be allocated by the market to the pool members. We discuss the general issue of royalty-free licensing further in Part III.H below.

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The licensor's implicit payment to itself also may vary when it uses its IP as an input to different final products. In such cases, the non-discriminatory, ECPR license fee must similarly vary. In particular, ECPR requires the price charged by the bottleneck owner to vary with the use to which a competitor puts the IP. Specifically, if the license fee is X dollars per unit sold of a relevant final product in any submarket where the licensor offers the final product at a price of $50 per unit, then ECPR requires the license fee to fall to X − $4 on sales in any final product segment where the licensor offers a price of $46. That is precisely what the ECPR competitive neutrality formula (1) tells us. Then, all things equal, the license fee must vary from one use of IP to another precisely by the amount that the corresponding final product prices vary. To take another case, assume the IP is used for two different final products. If the incremental costs of the other required inputs is the same for the two products, but the price of one product is $0.2 more than the other, the competitively neutral license fee for the two uses must also differ by exactly $0.2.[92] That is, *any discrimination in the IP owner's final product prices must be mirrored precisely in its IP license fees. That is exactly what formula (1) implies.*

There is an important consequence of this last result. In some cases where differential pricing is practiced, perhaps most often by regulated firms, only selective, cream-skimming, competitive entry may occur. In these cases entrants can profitably serve only those customers who face the prices that are highest relative to costs, and the consequence is that the incumbent is left without rivals in the supply to customers offered prices that are low relative to costs. But with the differential ECPR access costs just described, the return to entrants will be exactly the same, no matter which customers they serve. The lower returns provided by customers whose prices are relatively low will be precisely compensated for and offset by the lower access charges they are required to pay in an ECPR regime when they serve those customers. It follows that ECPR eliminates the incentives for cream skimming and opens all final product markets equally to efficient entrants.

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[92] It follows from (1) that if final-product *J* is the recipient of a cross-subsidy and is therefore priced below incremental cost (its profit yield to the bottleneck owner is negative), then the competitively neutral license fee for IP to be used in the production of *J must also be less than the incremental cost* of supplying the bottleneck service for the purpose. Though this result may be surprising, its logic is straightforward. Cross-subsidy of final products by the IP owner means that in order for rivals to compete effectively with the IP owner, replication of this cross-subsidy must be available to them in some way. If the IP owner sells product *J* to consumers at a price below cost, then it must provide its rivals with IP access at a price that does not cover cost as well. In other words, if product *J* is the recipient of a cross-subsidy when sold by the IP proprietor, then competitive neutrality requires that the same cross subsidy be made available to rival suppliers of *J* through the

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E. SOME IMPLICATIONS OF AN ECPR LICENSE FEE

Several consequences follow from such an ECPR license-fee arrangement.

(a) *Linking of the License Fee to the IP Owner's Final-Product Price.* If entry or other competitive developments force down the price of a final product with an IP input, other things being equal, the ECPR license fee (on a per-unit basis) must be reduced by exactly the same amount.[93]

(b) *Full Compensation of the Licensor: The Principle of Indifference.* With ECPR license fees, the IP owner will be *indifferent,* so far as profits are concerned, between using its own IP to provide a unit of final product and allowing downstream competitors to use its IP to produce a unit of

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license fee, as was just explained. This conclusion, however, likely has limited application if any outside of regulated industries.

[93] Rey and Tirole have questioned the effectiveness of ECPR, and have concluded that it "may not preclude or impose any constraint on foreclosure." Patrick Rey & Jean Tirole, A Primer on Foreclosure (Feb. 21, 1997) (unpublished manuscript, *available at* http://www.ftc.gov/opp/intellect/020522reydoc.pdf). In Rey and Tirole's game-theoretic model, the bottleneck input-owner seeks to avoid the loss of monopoly power that may result when prospective purchasers of access who are quoted high license fees fear that later purchasers will be offered lower license fees and so the former are driven not to accept the access owner's price offer. The IP owner in the model preserves its monopoly power by forward integration, in effect becoming its own IP customer. This is supposed to solve the assumed price-commitment problem posed by the IP owner's postulated inability to foreswear credibly opportunistic later reductions in input prices and it thereby successfully restores its bottleneck market power. Rey and Tirole conclude, however, that ECPR does not prevent the input-owner from achieving this restorative solution. It is questionable, however, whether the commitment problem that is the underpinning of the Rey and Tirole analysis is a significant real-world phenomenon. For one thing, as Rey and Tirole themselves note, nondiscrimination laws, such as the Robinson-Patman Act can by themselves serve to eliminate the prospect of opportunism and "solve" the would-be bottleneck monopolist's commitment problem (although concededly the Act does not apply to pure licensing transactions, *see supra* note 81). Contractual nondiscrimination clauses (or other putatively enforceable private commitments, such as the RAND obligation itself) may also serve the same purpose. *See, e.g.,* Leslie M. Marx & Greg Shaffer, *Opportunism in Multilateral Vertical Contracting: Nondiscrimination, Exclusivity and Uniformity: Comment,* 94 AM. ECON. REV. 796 (2004). Additionally, the innovation activity of large business firms is very much a repeated game in which a firm can demonstrate its commitment to nondiscriminatory licensing through its past behavior. In any event, we disagree with Rey and Tirole on the key issue for our purposes, i.e., that ECPR does not prevent exclusion of efficient entrants by a forward-integrating input monopolist. To the contrary, it can be shown that a rival who is exactly as efficient as the IP owner will always earn exactly zero economic profit, i.e., competitive profit, if charged the ECPR license fee and final-product price is the same for all suppliers. Moreover, because ECPR covers opportunity cost per unit of output, it preserves the IP owner's profit when access is granted. Thus, ECPR does not permit foreclosure of entry because it keeps the access fee from remaining unchanged as envisaged in the Rey-Tirole scenario, and keeps the fee at a level that does not prevent access. The IP owner is generally assured of total net earnings at least as large as under its monopoly, even though ECPR permits the survival of every efficient entrant. (Proof available from authors.) Finally, the contention implicit in the Rey and Tirole discussion that ECPR does not curb undesirable monopoly power is addressed in Part III.I below.

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final product. The pricing formula both ensures competitive neutrality and guarantees that the IP owner will obtain exactly the same profit whichever of the two courses is taken. A license fee set in accord with formula (1) will yield the IP owner exactly the same profit from *each unit of each* product sold by a rival as the IP owner would earn by using its IP to supply that unit of the final product itself. This can be seen from equation (7). We will see presently, however, that the indifference principle, as described so far, is somewhat misleading. If sales by licensees that pay the ECPR fee expand total final product sales beyond the level possible for the IP owner acting alone, the IP owner will earn more profits than if it alone produced final goods with the IP.[94]

F. RELATIONSHIP BETWEEN THE ECPR ROYALTY RATE AND THE "REASONABLE" ROYALTY

In Part II we showed that an auction-like process at the time of standard selection was likely to yield a "reasonable royalty rate. Here the question is the relationship between an ECPR-determined license fee and such a "reasonable" royalty rate. As we will explain below, the two will normally be the same.

Consider first the case of an IP owner facing little if any competition from alternative technologies (for purposes of a given proposed standard), i.e., an IP holder with *ex ante* bottleneck monopoly power. No proprietor of such bottleneck IP will be willing to offer access at arm's length if the license price does not compensate that proprietor fully for any direct licensing costs as well as any opportunity costs (lost profits) incurred as a result of the transaction, an amount (as we have seen) that defines the ECPR price per ECPR formula (2) and that equals $P_{f,i} - IC_{r,i}$ per ECPR formula (1). In other words, the "reasonable" royalty in such a case will not be less than the ECPR-determined license fee. But the "reasonable" royalty in such a case also is unlikely to exceed the ECPR level. To see this, note that a given prospective licensee will be unable to afford access unless the royalty rate permits it to produce without losing money downstream, which will be the case only if the royalty is set at a level that is less than or equal to $P_{f,c} - IC_{r,c}$. If we assume that final prices are uniform across downstream producers[95] (so that

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[94] However, there is a possible exception to this conclusion. Even though at the ECPR price the IP proprietor will have no reason to care whether its firm or a competitor's produces a unit of the final product, it will not welcome downstream entry if it is so substantial that it reduces the final product price sufficiently to cut into the IP owner's profits.

[95] This assumption does not imply the absence of discriminatory final pricing—merely that any price discrimination is identical across all producers.

$P_{f,c} = P_{f,i}$) and that all such producers are equally efficient[96] (so that $IC_{r,c} = IC_{r,i}$), then the "reasonable" royalty in such a market cannot exceed $P_{f,i} - IC_{r,i}$. Thus, the "reasonable" royalty that will emerge in such a licensing market can only be the ECPR-determined license fee.[97]

Next consider the case where there is ample *ex ante* competition in the IP licensing market. In such a scenario, no technology owner has bottleneck market power either *ex ante* or *ex post* (at least if the technology owner is effectively constrained *ex post* by pre-selection commitments). When any such technology owner contemplates before selection the royalty at which it is willing to commit to license its IP to rivals, there is no opportunity cost in the form of lost downstream profits. Because there are good technology alternatives, a policy of withholding IP from rivals will not divert final-product business from them—it will merely lead them to veto the selection of the owner's technology as a standard. Thus, in the case of *ex ante* IP competition, ECPR formula (2) becomes:

(8) $P_i = IC_i +$ *the IP owner's incremental opportunity cost of licensing to others* $= IC_i + 0 = IC_i$.

This merely confirms that the royalty will be set equal to the (appropriately defined) incremental cost of licensing, which is what we would expect of a "reasonable" royalty under highly competitive conditions.[98]

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[96] The assumption of equal efficiency does not significantly undermine the generality of our conclusions. Under the alternative assumption that the IP holder is materially more efficient than its downstream rivals no licensing would take place in any event as the rivals would be unable to compensate the licensor for its lost profits on downstream production. Conversely, if we were to assume that the IP holder is materially less efficient, there would be no rational (legitimate) incentive for the licensor to produce the final product.

[97] While such a licensing market is admittedly not competitive (by hypothesis), the foregoing discussion demonstrates that if the downstream price is sufficiently low the ensuing royalty will equal the royalty that would prevail in a fully "competitive" licensing market. This is merely an illustration of the well-recognized proposition that the exercise of) market power over IP can be constrained by competition in downstream product markets. *See* DOJ-FTC Intellectual Property Guidelines, *supra* note 2, § 3.2.2 & n.18 (technology market may include not just substitute technologies but also goods that are substitutes for goods that are produced with the licensed intellectual property). It is equivalently an illustration of the point we have already noted (and will elaborate further in Part III.I, *infra*) that elimination of any excessive final-product price will immediately and automatically reduce the ECPR royalty correspondingly. While our discussion in this section is focused on the time of standard selection, it is a possibility that market power downstream may increase after selection of the technology as a standard. In that case, the IP-owner would increase both its final-good price and its royalty, unless constrained; the higher post-selection royalty could still satisfy ECPR using the higher post-selection final-good price, but would no longer be "reasonable" as judged at the time of standard selection.

[98] *See supra* Part II.C.2.

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In a competitive licensing market where no party possesses bottleneck power over access to technology, one might not expect ECPR formula (1) to remain valid and to define a "reasonable" royalty rate. That is, when access to a particular piece of IP is not necessary to produce the final product—as when there are multiple competing types of IP suitable to the task—there is no reason to assume that the IP owner has any legitimate claim on any residual profits that downstream sellers obtain via a supracompetitive final product price, $P_{f,i} - P_{f,i}{}^* > 0$, where $P_{f,i}{}^*$ is the competitive downstream price. Then one might think that formula (1) would grant the IP owner profit on the licensed IP to which it apparently has no legitimate claim:

$P_i = P_{f,i} - IC_{r,i}$ *[license price = the IP owner's final-product price − the IP owner's incremental cost of remaining inputs.*

There is an important category of cases, however, where ECPR formula (1) remains valid even in the absence of bottleneck market power. If we assume that competition results in formula (2) applying in the form of equation (8), we find that $P_{f,i} - IC_{r,i} = IC_i$, $(= P_i)$ which by rearrangement yields $P_{f,i} = IC_{r,i} + IC_i$. In other words, when both formulas (1) and (2) hold true in a competitive scenario, it must also be true that the final-product price is not supracompetitive—rather, it will be equal to the sum of the incremental cost of all inputs. Such an outcome is likely, for example, when there are no barriers to entry downstream and vigorous *ex ante* competition in the licensing market.

Indeed, the foregoing demonstrates that license fees established by an auction-like process at the time of standard selection that satisfy ECPR formulas (1) and (2) also will be "reasonable" royalties when downstream barriers to entry are low *regardless of competitive conditions in the technology licensing market.*[99] To see why, suppose first that an IP holder proposes to license at a royalty rate that exceeds the ECPR level of $P_{f,i} - IC_{r,i}$.[100] Such a royalty would plainly not be accepted by any equally efficient licensees (and hence could not be "reasonable") as it would require production of the final product at a loss. Suppose instead that an IP holder proposes to license at a royalty rate *less* than the ECPR level, yielding excess profits to downstream production. In such a case, absent high downstream entry barriers, entry by new producers attracted by the

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[99] Of course, low entry barriers would imply access to IP rights necessary for downstream production. The general availability of licenses for necessary IP under a RAND commitment would suffice, though the royalty level will still depend on the amount of *ex ante* competition in the licensing market.

[100] For convenience we again assume uniform pricing and equal efficiency downstream.

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supracompetitive profits will force down the final-product price until the excess profits are gone. At that point, the "reasonable" royalty and the ECPR-determined royalty will be the same.[101]

G. ECPR AND EFFICIENT ALLOCATION OF INNOVATION USE AMONG FINAL-PRODUCT PRODUCERS

The implications for economic efficiency of an ECPR license fee depend on how it affects the interfirm allocation of production tasks in markets where the IP is an input. When both the patent holder and rivals use the IP to produce competing final goods, what share of that final output should be produced by each of these firms? Or, if that output will be produced by only a single firm, which of the firms should get the job?

Clearly, the royalty rate will influence the allocation of the task between innovator and licensee. The lower the fee, the more of the final product we can expect the licensees to supply, because lowering the license fee reduces their production cost. If license fees are negotiated individually and differ among licensees, the allocation of final-output production among those firms will also be affected. A socially optimal set of fees is one that permits efficient allocation of the task of final-product supply among the competing providers. Specifically, the most efficient producers of final product should be assigned that task by the market, whether that efficient producer is the IP proprietor, one (or several) of its horizontal rivals, or some combination of those firms.

But that is evidently what ECPR does. The Level-Playing-Field Theorem shows that only rivals who can produce at least as efficiently as the IP owner will be able to afford the ECPR license fee (and earn profits after paying that fee). A less efficient rival who has to pay the ECPR licensee fee and compete with the IP owner's final product price will not be profitable and will be forced from the market. On the other hand, rivals that are more efficient at final-product supply than the IP owner will be able to pay the ECPR license fee and still profitably underprice the IP owner's final product.

In sum, ECPR pricing will *automatically* give shares in the final-product market to the firms that are its most efficient suppliers. In the extreme

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[101] If we relax our assumption of equal efficiency, in the case of an *ex ante* competitive licensing market, a more efficient IP holder (where $IC_{r,i} < IC_{r,c}$) will still lack the bottleneck market power to collect a fee that is higher than the market-driven "reasonable" royalty level. Alternatively, if we assume that $IC_{r,i} > IC_{r,c}$, there would be no rational reason (whether legitimate or anticompetitive) for the IP holder to produce the final product and the ECPR-determined fee would be irrelevant.

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case, the end result may even be an equilibrium with complete specialization, with the other market at issue—that for innovation—dominated by the IP supplier (assuming that it is the most efficient supplier of R&D), while licensees who are more efficient at providing final product become the principal suppliers of the final products.

H. ROYALTY-FREE LICENSING AND ECPR

In practice, technology sometimes appears to be traded "for free," with Firms X and Y each permitting the other to use its IP without running royalties. Such "royalty-free" licensing is occasionally required by standard-setting organizations, particularly in the Internet standard-setting arena.[102] These types of de facto or de jure cross-licensing or pooling arrangements are one means by which companies resolve blocking patent (or other IP) positions among themselves.[103] One common justification offered for this approach is the standard (and static) textbook view that licensing is effectively costless, a view to which we have already taken serious exception. Another is that zero prices save record-keeping and administrative costs, without affecting anything else, whenever the royalties firms otherwise would pay each other would balance out in the long run.[104] Elimination of the license fee in such cases seems equitable and efficient. But this argument ignores the inefficiency induced by a zero price for use of an item whose user cost is not zero.

To make the point more concrete, suppose that both firms produce two items, A and B, with the former product using as an input IPx, supplied by firm X and the latter using IPy, supplied by firm Y. Suppose, moreover, that use of either input by either firm has some cost to the provider. Then its supply at a zero price will not only lead to overuse by the licensees, but also to misallocation of the task of producing A and B.

A zero price means that Firm Y can increase its use of Firm X's IP without additional cost to itself—its marginal cost of such added IP use is zero. This gives Y a clear incentive to add to its output of the final product, A, that uses X's IP beyond the efficient quantity that it would have supplied if it were charged the ECPR license fee. Similarly, Firm X will be given the incentive to overproduce the other final product, B,

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[102] *See* Lemley, *supra* note 7, at 1906; Patterson, *supra* note 12, at 1053 n.39.

[103] *See* Shapiro, *supra* note 9, at 129–30 (noting that while such cross licenses "involve no running royalties, . . . they may involve balancing payments at the outset to reflect differences in the strength of the two companies' patent portfolios as reflected in a patent pageant, and/or the vulnerability of each to an infringement action by the other").

[104] In the typical standard-setting context, however, only a limited number of firms (if any) will possess the kind of broad IP portfolios generally thought to be a traditional condition for "royalty-free" cross-licensing or pooling.

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that employs Y's IP. In an extreme case, Firm X may displace Y as producer of B even though it is the less efficient producer of that item, while the reverse may occur in the production of A.[105] Such misallocations contrast with the consequences of an ECPR licensee fee, which assigns the tasks of innovation and final product supply to the firms that can carry them out most efficiently

For these reasons, the practice by some SSOs of requiring royalty-free licensing is troubling, although we acknowledge, as Shapiro puts it, that "*any* cross license is superior to a world in which . . . patent holders [with mutually blocking positions] fail to cooperate, since neither could proceed with actual production and sale in that world without infringing on the other's patents."[106] If anything, the incidence of "royalty-free" cross-licensing or pooling scenarios seems to be diminishing outside the standard-setting arena in many, if not most, industries.[107] Moreover, such licenses actually may not be royalty-free in the economic sense. For instance, periodic adjustments to technology-trading agreements may be anticipated in connection with ongoing relationships (involving balancing payments in cash or via the contribution of additional innovations to the deal) that implicitly amount to the (net) payment of positive running royalties (to the extent that one party in reality ends up making greater use of the traded IP than the other).

I. MONOPOLY PROFIT

It has often been argued that a major deficiency of ECPR is that, by itself, it is incapable of eliminating or reducing any illegitimate monopoly profit. Indeed, as the contestable markets model shows, such excess profit can be eliminated only if ECPR is accompanied by an appropriate cap on final-product price.[108] ECPR merely transmits such undesirable

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[105] An analogy brings out the problem more clearly. Consider two rival restaurant owners who frequently dine in one another's establishments. If they agree to waive the charges to one another, each will, in effect, be dining at an "eat all you want" buffet. Will this not induce obesity of both proprietors?

[106] Shapiro, *supra* note 9, at 123.

[107] *See, e.g.,* ASHISH ARORA, ANDREA FOSFURI & ALFONSO GAMBARDELLA, MARKETS FOR TECHNOLOGY 80, 178 (2001) ("Although traditionally cross-licensing arrangements have been royalty-free, in the last ten or fifteen years, firms with stronger and larger patent portfolios have been demanding and receiving royalty payments." "Whereas initially the cross-licensing arrangements were essentially barter trades, in that technology was exchanged for technology, recent arrangements appear to involve significant monetary transfers as well, from companies with weak patent portfolios to those that hold critical patents or those with more substantial portfolios."); John H. Barton, *Antitrust Treatment of Oligopolies with Mutually Blocking Patent Portfolios,* 69 ANTITRUST L.J. 851, 855 (2001).

[108] The pertinent analysis also suggests that under regulation the price cap should be set at the level of the stand-alone cost of the item in question, that is, at the level of price

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attributes of the final-product price to the license fee. This means that, by the nature of its construction, an ECPR license fee can yield excessive profits if and only if the final-product price does so. That is a direct implication of the Level-Playing-Field Theorem and its derivation.

This, of course, is in general not relevant for license fees for patented IP under rules that are designed to offer the opportunity to reap "temporary monopoly profits" as an incentive for innovative activity. The fact that the law does not make licensing compulsory indicates that such returns are normally presumed not to be excessive.[109] Where there do happen to be particular reasons to consider the final-product prices excessive, however, the appropriate remedy is surely not a distortion of the terms on which IP is made accessible to competing licensees.

In the standard-setting context, an IP holder is likely to earn a supra-competitive return only (i) when it possesses market power *ex ante*; or lacking *ex ante* power (ii) when it nonetheless obtains and exercises market power post-selection because either (a) SSOs and private actors did not adopt appropriate measures to constrain such power, or (b) SSOs and private actors adopted appropriate measures but the IP holder breached such restrictions. We believe that ECPR is applicable to RAND analysis in each of these cases (though the presumptive remedy in case (ii)(b) is to require compliance with the breached restrictions), and the fact that ECPR (alone) may not suffice to deprive the IP holder of supranormal returns in such cases should not offend antitrust or IP policy. This is clearest in case (i), where there are no significant substitutes for the innovation the IP holder has created.[110] Even in case (ii)(a), at least when there has been no fraud or misrepresentation, one might question whether there is a strong policy rationale for depriving the IP holder of the return to innovation accruing to the position that market participants have negligently thrust upon it.

The bottom line is that ECPR is still relevant in such cases in helping to deter the extension of monopoly power from IP licensing markets into

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such that any further increase would be unsustainable if the market in question were competitive because entry would thereby be attracted.

[109] *See* Patterson, *supra* note 12, at 1052 ("U.S. patent law does not explicitly provide for compulsory licensing."). *Cf.* Verizon Communications Inc. v. Law Offices of Curtis V. Trinko, LLP, 540 U.S. 398, 407–08 (2004) ("Firms may acquire monopoly power by establishing an infrastructure that renders them uniquely suited to serve their customers. Compelling such firms to share the source of their advantage is in some tension with the underlying purpose of antitrust law, since it may lessen the incentive for the monopolist, the rival, or both to invest in those economically beneficial facilities.").

[110] *See, e.g.,* Image Technical Servs., Inc. v. Eastman Kodak Co., 125 F.3d 1195, 1224–27 (9th Cir. 1997) (recognizing right of IP holder to earn even monopoly returns on IP and therefore omitting from remedial injunction in § 2 case any provision requiring licensing

downstream markets, but it neither eliminates nor facilitates monopoly profits in the licensing market itself. It is not an instrument designed for that purpose. Excessive pricing for IP originates from a lack of (or failure to capitalize on) *ex ante* competition in the IP market, which, in turn, may be aggravated by any lack of competition in downstream markets. Other means are required to limit the exercise of monopoly power in the licensing or final-product markets that leads to socially excessive overcharges. Such means may include SSO auctions and RAND stipulations that yield *ex ante* competitive royalties and (when *ex post* licensing market power arises for whatever reason) the regulatory elimination of any excessive final-product price (which, as we have previously noted, will immediately and automatically reduce the ECPR royalty correspondingly). The fact that ECPR alone does not eliminate monopoly profit or monopoly power is no more to its discredit than the fact that it does not help to cure cancer or baldness or solve any other problems it was not designed to remedy.

J. ECPR WHERE DOWNSTREAM COMPETITORS PROVIDE IMPERFECT SUBSTITUTES

In discussing the attributes of ECPR we have assumed up to this point that downstream rivals of the licensor supply products that are perfect substitutes for the licensor's. This leads to the presumption that every x-unit in increased sales by a rival will reduce the licensor's final-product sales quantity by precisely x units. This, in turn, underlies the mathematically derived conclusion that the ECPR price precisely covers the licensor's opportunity cost resulting from licensing, that is, the profit that the licensor forgoes as a result.

But what if a rival's product is an imperfect substitute for the IP owner's final product, so that an x-unit expansion of final product sales by the licensee only cuts the licensor's sales by, say, 0.6x? Then the opportunity cost incurred in the licensing process is also correspondingly lower— only 60 percent of the profit of x units of sale by the licensor. Competitive neutrality then calls for the license fee to be reduced similarly. In such cases, the license fee should be set according to formula (2), where the opportunity-cost component is now 40 percent lower than the IP owner's profit per unit of final-product output.[111] This lower fee will provide

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at "reasonable prices" while still maintaining duty to avoid discrimination against downstream rivals).

[111] While royalties under this approach will be literally discriminatory, they will nonetheless be competitively neutral. It should be noted that in the case of imperfect-substitute final products it is not so easy to provide a level playing field theorem because it is difficult 343in that state of affairs to define a "level playing field." While earlier, with identical products,

compensation sufficient to ensure that permitting others to use its IP to produce competing final goods will not reduce the licensor's earnings.[112] Of course, at a certain point, administrability concerns (and legal principles of relevant market definition) suggest that a sufficiently imperfect substitute be deemed no competition at all, relieving the IP holder of RAND nondiscrimination obligations, at least for that particular use.[113]

It is straightforward to demonstrate the theoretical optimality properties of our modified ECPR rule. We need only remind ourselves of the standard result of economic analysis that shows the economic optimality (economic efficiency) of the prices that emerge in any (theoretical) market that is perfectly competitive (the Arrow-Debreu theorem).[114] The license fee just described is precisely the price that would be charged in a perfectly competitive market for licenses—one in which there existed a large number of perfectly substitutable IP solutions competing with one another for licensee customers. That is, the price would exactly equal any incremental cost entailed in provision of the license, plus any actual opportunity cost entailed in the grant of such a license.[115] It follows that the calculation of the ECPR license fee should be modified in the manner just described and that this generalized ECPR fee, even if more difficult to calculate and monitor in practice, will offer all of the advantages of ECPR already described.

IV. VOLUNTARY LICENSING AND INCENTIVES TO PARTICIPATE IN STANDARD SETTING

The licensing of IP can promote the rapid dissemination and adoption of new processes and new products, which, in turn, can promote both economic growth and competitive markets. This may appear to make

we had shown that formulas (1) and (2) are equivalent, here we are taking the position that (2) provides more appropriate guidance.

[112] Armstrong has proposed a similar generalization of the ECPR rule, showing that this is necessary for preservation of the efficiency properties of the approach. *See* Mark Armstrong, *The Theory of Access Pricing and Interconnection*, in 1 HANDBOOK OF TELECOMMUNICATIONS ECONOMICS 295–384 (Martin E. Cave et al. eds., 2002).

[113] Recall that we have argued *supra* in Part III.A that the RAND nondiscrimination commitment should be held inapplicable to the extent that IP holders are not in competition with their licensees.

[114] Kenneth J. Arrow, *An Extension of the Basic Theorem of Classical Welfare Economics*, in PROCEEDINGS OF THE SECOND BERKELEY SYMPOSIUM ON MATHEMATICAL STATISTICS AND PROBABILITY (1951); GERARD DEBREU, THEORY OF VALUE (1959). The exception to this fundamental result is the case where externalities interfere with the workings of the market mechanism.

[115] An analogy will show why this is so. Consider a piece of real estate that a prospective shopkeeper wants to rent, to open up in competition with a nearby shop that is also owned by the prospective lessor. If many competing landlords were in a similar position, it is 344evident that none of them would rent their property unless the rental fee covered the

mandatory licensing an attractive option. The courts, however, have been reluctant to move in that direction. One good reason for this reluctance would be a desire to avoid measures that risk expropriating assets of the IP owner that were legitimately acquired and retained. While there may be no basis on which to argue that the result is even approximately optimal, here as elsewhere market forces are able to deal effectively with much of the problem. The fact is that voluntary licensing is widespread in practice and appears to be expanding.[116]

In any event, there is little question that the law generally does not compel IP holders to license their innovations on "reasonable" terms or even to license them at all.[117] This is well illustrated by the case of unanticipated "submarine" patents facilitated by the provisions of patent law that permit patent applications to remain confidential for a period of time.[118] "The basic scenario is that a patent applicant allows its applica- tion to languish in the PTO while watching another company make substantial investments in a technology or product that will infringe the yet-to-be-issued patent. Once the other company's sunk costs are large, the patent applicant obtains the patent, asserts infringement, and 'holds up' the other company, demanding supracompetitive royalties for a license to the 'submarine patent.' The company must agree to supra- competitive royalties or forego its production or innovation."[119] Subma- rine patents were a particularly significant risk in the period when patent applications were not published prior to issuance; in 1999, however, Congress amended the patent laws to require that most applications be published 18 months after filing.[120] Of course, the absence of mandatory

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direct cost plus the actual opportunity cost, but competition would prevent them from charging more than this.

[116] *See* BAUMOL, *supra* note 65, ch. 6. It should be clear that if the price is right it will pay an IP proprietor to license, and to do so voluntarily. If it can earn $25 per widget it is able to produce with the aid of its IP and a rival offers it a license fee of $30 per widget that the latter supplies, clearly the IP holder can benefit by licensing even if the licensee's sale of a widget displaces a widget sale of its own. There are many other reasons for voluntary licensing, of course. One of the reasons for voluntary technology sharing that is particularly pertinent to the role of standard setting is the problem of "blocking" IP (including "patent thickets") and the widespread IP pooling and cross-licensing efforts that have arisen to deal with such problems.

[117] *See, e.g.,* HOVENKAMP, JANIS & LEMLEY, *supra* note 17, § 6.5c at 6-40 ("As a general proposition the American intellectual property laws do not require the IP holder to license."); Dawson Chem. Co. v. Rohm & Haas Co., 448 U.S. 176, 215 (1980) (compulsory licensing "is a rarity in our patent system").

[118] *See* FTC PATENT REPORT, *supra* note 10, ch. V(II)(B).

[119] *Id.,* ch. I(III)(A)(2)(a)(i); *see also id.,* ch. IV(II)(C)(1)(a).

[120] Under the 1999 amendments, applications filed only in the United States need not be published but all other applications (in practice, the great majority) must be published within 18 months of filing. *See* 35 U.S.C. § 122(b)(1); FTC PATENT REPORT, *supra* note 10, ch. IV(II)(C)(1)(a).

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licensing means that a hold-up phenomenon can also arise if a company sinks infringing investments while ignorant (for whatever reason) of a published patent application[121] or an issued patent.

This lack of mandatory licensing obligations creates an asymmetry between participants and non-participants in standard-setting activities. RAND obligations that flow from membership in SSOs or from participation in standard-setting exercises carried out under their auspices generally do not bind or limit those who elect to remain entirely outside the formal standard-setting process.[122] A decision against participation thus preserves an innovator's legally unfettered independence in licensing decisions, permitting it to assert its patents against (and hold up) those who cannot carry out a given standard without infringement.

Some have argued that this "asymmetric situation provides an incentive for firms *not* to participate in the standards-setting process."[123] We conclude, however, that mandatory RAND licensing under the model we have offered in this article is unlikely to deter a significant fraction of innovators from participating in standard-setting endeavors. We look at the participation decision for three types of holders of IP.

First, holders of IP whose rights are already *known* in an industry should not benefit from nonparticipation (with the possible exception, discussed below, of holders of monopoly IP). Those setting standards can take known IP rights into account. Indeed, because abstention by a holder of known IP raises the prospect of *ex post* opportunism in the event that its IP is selected as the standard, nonparticipation will tend to make selection *less* likely. In fact, by joining a standard-setting process and thereby *committing* to charge reasonable and nondiscriminatory royalties the holder of known IP rights may improve its chance of selection. A simple promise might not be credible without the commitment of becoming an SSO member subject to RAND obligations.[124] Logically,

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[121] It is possible for a patent stating broader claims to be issued after publication of a more limited application through the claim amendment process. *See* FTC PATENT REPORT, *supra* note 10, ch. IV(II)(C)(1).

[122] *See, e.g.,* Rambus, Inc. v. Infineon Techs. AG, 318 F.3d 1081, 1105 (Fed. Cir. 2002) (affirming judgment as a matter of law overturning jury verdict against patent holder in case of alleged nondisclosure to SSO on ground that patent holder withdrew from SSO before formal standard consideration commenced and before any duty to disclose otherwise arose), *cert. denied,* 540 U.S. 874 (2003).

[123] David J. Teece & Edward F. Sherry, *Standards Setting and Antitrust,* 87 MINN. L. REV. 1913, 1980 (2003).

[124] An exception to this rule may exist with regard to IP holders who possess a portfolio of rights and innovative activities that is subject in whole or part to retaliatory blockage by other IP owners. In such a case, the other holdings in the portfolio may serve as "hostages" allowing the nonparticipating member to commit credibly to reasonable and

the benefits of being able to make such a credible commitment are greatest for IP holders who face active competition and possess little or no *ex ante* market power (thus presenting the greatest risk of *disparity* between *ex ante* and *ex post* outcomes).

Second, few of those holding IP rights that are undisclosed or undiscovered, but that also bestow little or no *ex ante* market power because there are comparably valuable IP alternatives, are likely to remain outside a standard-setting process on the mere hope of holding up SSO members for supracompetitive royalties.[125] An IP owner with little *ex ante* market power faces a number of viable rivals, not all of whom may be counted on (in the absence of unlawful collusion) to refrain from participation. If, as seems logical, the likelihood of selection is enhanced by active participation, an IP owner seems unlikely to improve its prospects materially (and risks earning no return at all on its investments) by remaining outside the standard-selection process. Indeed, if an innovation is truly novel (and thus not known to those skilled in the relevant field), it may be impossible without disclosure and active participation by its proponent to incorporate it into a standard at all (even when the IP, if disclosed, would command significant market power).

Further, when strong competition for choice as a standard is forcing license fees toward incremental cost, the relative attractiveness of solutions from nonparticipating IP holders that are ostensibly royalty-free will decline. Indeed, the mere fact that some item of technology appears to (or does) bear a zero royalty rate does not necessarily guarantee success. Royalty-free Linux software, for example, has not (at least yet) driven Microsoft from the market for operating systems used by server computers. Royalty-bearing technology can prevail over royalty-free options for several reasons, including the possibility that "royalty-free" technology may require the user to incur costs normally borne largely by the IP licensor, such as costs for training, maintenance, updating, etc. The likelihood that a nondisclosure strategy will succeed is thus significantly diminished to the extent that the technology covered by undisclosed IP rights is inferior to competing technology in terms of operating cost or product quality (i.e., when *ex ante* market power is low).[126]

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nondiscriminatory licensing. But in such a case, nonparticipation raises no problems or impediments for the standard-setting effort.

[125] Of course, the 1999 patent law amendments requiring early patent publication have reduced the incidence of "submarine" patents in the first instance.

[126] To illustrate this proposition, suppose that the alternative standards under consideration are all perfectly interchangeable *ex ante* and that the corresponding patented technologies vary only in terms of the resulting manufacturing costs for the standardized product.

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Third, holders of known or unknown IP that bestows substantial *ex ante* market power (monopoly power, in the antitrust sense) also may not find themselves materially deterred from participating in standard-setting proceedings and assuming RAND obligations. It remains possible, of course, that a holder of monopoly IP might choose to abstain in order to avoid RAND obligations that limit its ability to leverage its power into downstream markets. But much technology involves large amounts of intellectual property owned by many different firms, so a potential opportunist may place little weight on such freedom, recognizing that misbehavior only invites revenge by the proprietors of other essential IP rights who can wield them to block the activities of the hold-out firm. In fact, an IP monopolist may well shun disputes and litigation and place high value on embracing the safe harbor protections putatively offered by adherence to RAND obligations. Most significantly, such an IP holder will not perceive RAND obligations as confiscatory given that (as we have interpreted them in this paper) such obligations permit an *ex ante* monopolist to reap and retain monopoly royalties (which presumably represent an appropriate return on innovation).[127]

Assume further that use of patent Y results in the lowest manufacturing cost, and that use of patent X results in somewhat higher costs. In a competitive standard selection process, the standard linked to patent Y is likely to be chosen so long as the owner of Y offers a royalty that exceeds the royalty on X by an amount that is slightly less than the difference between the manufacturing costs under patents Y and X. If the apparent royalty on the technology corresponding to X is zero (because of nondisclosure of the patent), then Y will be selected as long as its royalty is just slightly less than the savings in manufacturing costs. Now, if the owner of Y cannot afford to license at such a rate (e.g, because the royalty is less than the incremental cost of licensing), we would not expect to see it offering Y in competition with X in the standard-selection exercise (unless participation is cost-free, an unlikely assumption). That is, when we observe Y being offered in competition with ostensibly royalty-free X at a positive royalty, R, we may rationally conclude (in this hypothetical) that R is less than or equal to the manufacturing cost savings or other benefits of using Y (and also exceeds the incremental cost of licensing Y).

[127] It might be argued that holders of undisclosed IP possessing some degree of *ex ante* market power—though falling short of monopoly power in the antitrust sense—might abstain from participation to gain the potential payoff from avoiding reasonable royalty RAND obligations. We are not convinced, however, that this scenario presents an empirically significant concern for several reasons. First, most of the potential disadvantages of abstention that we have already canvassed in the "full monopoly" case (e.g., the inability to disclose and "teach" truly novel innovations, the potential vulnerability to reciprocal retaliation, the loss of safe harbor protections) must also be weighed against the royalty payoff from nonparticipation in this scenario. Indeed, that payoff—at most, the extent to which a "full monopoly" royalty would exceed a "reasonable" RAND royalty—is a function of the nature and extent of the competition the IP holder faces in the standard-selection process. The higher the payoff to abstention, the greater the uncertainty and the greater the risk that nonparticipation will result in nonselection because of the existence of competing alternatives. The closer the IP holder is to certainty of selection regardless of participation (i.e., the closer to the "full monopoly" case discussed above), the lower the payoff from abstention. It is possible, of course, that "just so" cases might arise where the likely payoff exceeds the risks (where the IP is just far enough away from monopoly but

Moreover, to the extent that ECPR license fees are mandated under RAND, there is ground for the conclusion that the IP owner may even expect to be better off. We have seen that the parity price provides full compensation to the IP holder for any of its final-product sales that are displaced by that of a licensee. But the licensor stands to gain more than compensation for profits forgone from the loss of sales to a rival. An ECPR price offers market share to more-efficient suppliers, and more-efficient rivals may be able to reduce the final-product price and expand the market. If so, the IP owner will obtain *total* net earnings greater than those it could have gotten if it had refused to license. For the licensor's per-sale return equals L (ECPR license fee = forgone profit per unit of final product provided by the licensee) multiplied by N (number of those products sold by licensees). But if N > M, the number of units of final product that would have been sold by the IP holder in the absence of licensing, it follows at once that

IP total profit absent licensing = LM < LN, IP total profit from an ECPR fee.

Thus, wherever there exist final-product producers more efficient than the IP owner the latter stands to gain by licensing, and in any event the IP owner will never lose out under an ECPR license fee. For if licensees are neither more nor less efficient than the IP proprietor, the latter will earn the same whether or not it licenses, while if no prospective licensee is as efficient as the IP owner, no rival will be able to afford the license, as the public interest requires, and so final-product supply will then be left exclusively to its most efficient provider, the IP owner.

The conclusion is that if the participants in the market for IP licensing behave rationally, there will normally be no reason for compulsory licensing. The market will do its job, here as elsewhere. The market also helps deal with the fundamental dilemma, the apparent incompatibility of rapid dissemination of new and superior IP and the provision of incentives for investment in the innovation process. Voluntary dissemination at fees mutually advantageous to licensor and licensee simultaneously provides the incentive for innovative activity and speeds dissemination and utilization of its output. In economic jargon, ECPR license fees help to internalize the externalities of innovation. In other words, they help the innovator to do well by doing good.

We cannot categorically rule out the possibility of an occasional holder of "stealth" IP electing to treat its property as little more than a lottery

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selection is still just certain enough), but we have seen no evidence from the literature, the case reports, or the record of the DOJ/FTC hearings to suggest that such cases are common occurrences.

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ticket by abstaining from SSO activities. If anything, however, the scenario of greater concern has been thought to be the one where an IP holder actively participates in the process and lulls SSO participants into (wrongly) assuming that it has no undisclosed IP. We turn next to a discussion of this scenario and the broader issue of disclosure obligations in standard-setting efforts.

V. IP DISCLOSURE OBLIGATIONS

Disclosure obligations raise a special and critical issue in the realm of standard setting. IP that is necessary for adherence to the selected standards gains a competitive advantage, and perhaps even the power to hold up those who seek to offer standard-compliant products. Unsurprisingly, SSOs typically adopt policies requiring their members to disclose ownership of specified IP rights during standard-setting exercises.[128] In practice, however, such SSO disclosure policies have proven to be controversial, not least because they have frequently been beset by a lack of clarity and precision.[129] The Federal Circuit has opined that "[w]hen direct competitors participate in an open standards committee, their work necessitates a written patent policy with clear guidance on . . . what, when, how and to whom the members must disclose."[130]

At first glance, suitably clear disclosure obligations would seem to be generally in the public interest. Mandatory disclosure provides information that can attract potential licensees and enables them to negotiate licensing terms rationally. Disclosure also can help others who are in a position to invent products or processes that improve on the existing IP. Perhaps most important, disclosure can facilitate and stimulate rapid dissemination of improved technology and replacement of its obsolete predecessors.

Nevertheless, these benefits, however laudable, represent only one side of the coin. They do not account for the cost to IP holders of an SSO compelling them to disclose innovations when they are not (otherwise) legally required to do so. Trade secrets need not be divulged,

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[128] See Lemley, *supra* note 7, at 1904–05, 1957.

[129] See *id.* The Federal Circuit has underscored the disadvantages associated with vague disclosure policies, explaining that: "Just as lack of compliance with a well-defined patent policy would chill participation in open standard-setting bodies, after-the-fact morphing of a vague, loosely defined policy to capture actions not within the actual scope of that policy likewise would chill participation in open standard-setting bodies." Rambus, Inc. v. Infineon Techs. AG, 318 F.3d 1081, 1102 & n.10 (Fed. Cir. 2002) (holding that the patent disclosure policy of the Joint Electron Devices Engineering Council, an SSO, was beset by a "staggering lack of defining details"), *cert. denied*, 540 U.S. 874 (2003).

[130] *Id.* at 1102.

and such protection, unlike patent protection, has no fixed term.[131] The economic value of trade secret information depends on its not being generally known. Innovators certainly are not legally obligated to divulge anything about their trade secrets, including their assessments of the patent potential of their inventions. Those who apply to patent their IP must disclose their inventions sufficiently so that those skilled in the art can practice the patent without undue experimentation, but the burden remains on third parties to discover the application (after a period of enforced secrecy[132]) or the issued patent. Requiring innovators to accept disclosure obligations that exceed those required under the patent laws or that are inimical to trade secret protection is costly not only in terms of its direct impact on those whose valuable trade secrets are taken but also through its chilling effect of diminishing future incentives to invest in innovation.[133]

In addition to risking diminution of the rewards to innovation, SSO disclosure policies also can raise antitrust concerns because they might be misused to promote anticompetitive coordination or collusion among rivals. For example, requiring members to disclose unpatented (or uncopyrighted) trade secrets, or future intentions or plans for R&D, patenting, or other innovative activity would be legally suspect.[134] The antitrust laws generally discourage the exchange of competitively sensitive business information on the ground that such collaborations pose an unacceptable risk of facilitating anticompetitive coordination.[135] This

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[131] *See* DOJ-FTC Intellectual Property Guidelines, *supra* note 2, § 1.0; J. Gregory Sidak, Trade Secrets and the Option Value of Involuntary Exchange (unpublished manuscript, Aug. 2004), *available at* http://ssrn.com/abstract=577244.

[132] As previously noted, patent applications are not published until 18 months after filing. If filed only in the United States, a patent does not become public until issuance. *See supra* note 83.

[133] *See* Benjamin Chiao, Josh Lerner & Jean Tirole, The Rules of Standard Setting Organizations: An Empirical Analysis 5–6 (Harvard Bus. Sch. Negotiations, Orgs., and Mkts. Research Paper No. 05-05, Feb. 9, 2005) ("In our interviews, firms highlighted several costs associated with the disclosure of information in the standard setting process, even of already-issued patents. In particular, they argued that due to the number and complexity of patent portfolios, rivals frequently could not determine 'the needle in the haystack': that is, which patents were relevant to a given standardization effort. By highlighting the relevant patents or applications, in many cases firms felt they were disclosing valuable information to competitors about the applicability of their patent portfolios and their future technological strategies more generally.") (footnote omitted).

[134] *Rambus*, 318 F.3d at 1102 (concluding that "a member's intentions to file or amend [patent] applications do not fall within the scope of [the SSO's] disclosure duty," relying in part on the testimony of an SSO witness that "because antitrust laws discourage direct competitors from discussing market-driving innovations, [SSO] members 'were not supposed to reveal their future plans'").

[135] *See, e.g.*, LAWRENCE A. SULLIVAN & WARREN A. GRIMES, THE LAW OF ANTITRUST: AN INTEGRATED HANDBOOK 234 (2000) ("Concerted information programs should be

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risk that competitive disclosures will foster collusion counsels in favor of restricting the scope of mandatory disclosures among competitors; indeed, it has been persuasively argued that this risk warrants limiting SSO disclosure obligations to no more than "essential" IP.[136]

The optimal balance between these conflicting concerns in disclosure policy design—promoting the legitimate interests of standard setting and preserving competitive incentives for innovation—is a subject beyond the scope of this article. We have seen no persuasive argument, however, for imposing any duty that extends beyond essential patents and copyrights (and public patent applications that would yield essential patents). In any event, when disclosure duties are no broader than this, we believe it is clear that every SSO participant, whether or not it makes a compliant disclosure, should be subject to RAND licensing obligations.[137] As Lemley

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challenged when analysis suggests that they are, on balance, competitively harmful."); United States v. Container Corp. of Am., 393 U.S. 333 (1969).

[136] *See, e.g.,* Lemley, *supra* note 7, at 1959 ("Limiting the scope of the IP rules so that they cover only essential IP will . . . help an SSO avoid antitrust scrutiny. In the analogous context of patent pools, the DOJ has looked more favorably upon patent pools that were limited to necessary patents, because they presented less risk of industry-wide collusion."). "Essential" in this sense is typically taken to mean reasonably necessary to practice the standard in question. "Stated another way, there must be some reasonable expectation that a license is needed to implement the standard." *Rambus,* 318 F.3d at 1101 ("To hold otherwise would . . . render the [SSO] disclosure duty unbounded. Under such an amorphous duty, any patent or application having a vague relationship to the standard would have to be disclosed."). *Id.* Of course, a broader set of IP rights than those necessary to practice the standard may properly be deemed essential in the economic sense. Virtually any IP that offers its users a competitive advantage can, *ceteris paribus,* conceivably drive an otherwise equally efficient firm from the market. That is a consequence of one of the features of an effectively competitive market that is most beneficial to the general welfare—the fact that in such a market a firm that is inefficient to any significant degree cannot expect to survive. In that sense, we might consider essential any new product or process that gives its exclusive user a competitive advantage over firms that are otherwise equally efficient. On this view, only IP whose competitive advantage is demonstrably immaterial can reasonably be considered inessential. One must remain at least a bit concerned, however, about the potential sweep of such a conclusion. It seems to suggest that non-access to any (even minimally valuable) IP could be deemed anticompetitive (although we are addressing here nothing more than the scope of SSO disclosure and RAND licensing obligations, and certainly are not construing these cases to fall under the "essential facilities" doctrine). Antitrust law generally does not take note of efforts to seize or retain small advantages out of concern over administrability, if nothing else. Such administrability concerns would be apt here. For example, as the Federal Circuit has noted, under a more inclusive approach, "any patent or application having a vague relationship to the standard" might well be covered. One would worry much more about collusion than possible small imbalances if mere participation in an SSO were held to entail mandatory disclosure and licensing obligations for all such IP. That is, instead of one or two essential patents, the whole thicket of scores or hundreds of IP rights could be put in play in an environment lacking some or many of the safeguards against collusive spillovers that the DOJ, FTC, and the courts generally require when competitors gather together.

[137] Lemley, *supra* note 7, at 1961–62 (noting that "a licensing obligation should apply to IP whether or not it is disclosed").

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has observed, "nondisclosure is a successful anticompetitive strategy only if the IP owner can use its IP rights to hold up users of the standard."[138] This option is (or should be) unavailable to a licensor who is obligated to license essential IP on RAND terms—so long as a holder of undisclosed IP cannot shed its RAND obligations merely by resigning from an SSO after having sought to influence a standard-selection process that has formally commenced.[139] This can be seen by comparing the effects of nondisclosure when IP holders are and are not constrained by the RAND obligations we recommend in this article.

Imagine a firm, X, that joins a standard-setting organization, and participates in some of its deliberations. X withholds from other participating enterprises the fact that it holds a patent application that, if granted, will be essential if a standard, S, is adopted. X succeeds in persuading the others to adopt standard S, even though there are alternatives that rely on readily available alternative technologies. First, assume that the SSO imposes no RAND obligations on its members. After the patent issues and other firms have made the investments required to adhere to the standard, X can proceed to exercise monopoly power that the standard, S, has bestowed on its IP. In these circumstances, intentional failure to disclose may well amount to an antitrust violation.[140] But the need for antitrust intervention may evaporate if instead the would-be monopolist is bound by a suitably-applied RAND obligation (as discussed directly below). In such a case, it will lack the ability to charge royalties that reflect market power created by standard selection or investments others have made to follow the standard. It also will lack the ability to discriminate against other users of its IP.

The application of the RAND obligation to undisclosed IP held by participants in a standard-setting process is (we believe) reasonably straightforward even though the process cannot yield an "auction bid"

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[138] *Id.* at 1961.

[139] *Cf. Rambus*, 318 F.3d at 1105 (examining issue of whether implicit disclosure duty underlying fraud verdict arose before party's withdrawal from SSO, and concluding that "the disclosure duty, as defined by the [SSO] policy, did not arise before legitimate proposals were directed to and formal consideration began on the . . . standard"), *cert. denied*, 540 U.S. 874 (2003). We do assume that an IP owner has the option of disclaiming any RAND obligations in the SSO process by means of an express public declaration regarding specific patent, copyright, or other IP rights, *see supra* note 49, but we would not expect such a maneuver to be legally effective with regard to undisclosed rights.

[140] *See* Lemley, *supra* note 7, at 1927-35 (discussing requirements for antitrust liability in connection with failure to disclose IP in a standard-setting context). This has been the theory of several FTC enforcement actions. *See* Dell Computer Corp., 121 F.T.C. 616 (1996); Rambus, Inc., FTC Docket No. 9302 (issued June 18, 2002) (complaint); Union Oil Co. of Cal., FTC Docket No. 9305 (issued Mar. 4, 2003) (complaint); M. Sean Royall, 353*The Role of Antitrust in Policing Unilateral Abuses of Standard-Setting Processes*, ANTITRUST,

for the undisclosed IP. If delay and the process of choosing a new standard were costless, the optimal policy would be to revoke the standard and reopen the process for a new selection. When this is too costly to be feasible (as will presumably often be the case), we propose that the RAND royalty for an undisclosed IP right be set at the incremental cost of licensing.[141] Of course, the royalty also should satisfy ECPR when the licensor competes downstream.[142]

Our approach ensures that, consistent with RAND principles, the IP holder does not command greater royalties than would have ensued in the event of full disclosure. Of course, this objective would also be achieved by capping the appropriate royalty at zero in cases of nondisclosure. Such a policy would risk being counterproductive, however, for at least two reasons. First, because efficient technology transfer often will entail recurring licensing costs, a zero-royalty policy might lead to opportunistic and inefficient efforts by an uncompensated IP owner to stint on its licensing obligations. Second, a zero-royalty policy might arguably amount to an excessive penalty that (at least with regard to unintentional failures to disclose) could appreciably reduce incentives to innovate.

Our proposed approach also provides disincentives to strategic nondisclosure that yields inefficient standards (i.e., standards that differ from the ones that would ensue through full disclosure). To see this, consider a hypothetical standard selection process where technology A, in which an SSO participant holds IP rights, is competing for selection with several known IP-protected, royalty-bearing technologies (B, C, D, etc.). First, in the case where A is materially superior to available alternatives, selection is already guaranteed. Nondisclosure may cement selection (as no alternative technologies can compete when the best is royalty-free) but will not avoid RAND obligations and will (under our proposed policy) serve to deprive the IP holder of considerable returns in excess of the incremental cost of licensing to which, with disclosure, its superiority would have entitled it. Second, in the case where A is materially inferior to available alternatives, although there may be theoretical incentives

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Spring 2004, at 44–49. Notably, in none of these cases were participants in the standard-setting process subject to RAND obligations.

[141] Of course, the acceptably pertinent cost of licensing can legitimately include development expenses, particularly where the intellectual property elicits continuing sunk investment in R&D as further improvement in the IP remains possible. It should also probably include any other costs of innovation entailed in technology proposed for the standard-selection process, at least to the extent those outlays were not fully sunk before selection.

[142] Of course, this does not mean that the licensor would be permitted to use ECPR to obtain a *higher* royalty. Rather, ECPR would preclude the licensor from effectively charging itself a license fee below incremental cost.

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for nondisclosure, the likelihood of selection remains low to nil (as discussed in Part IV, *supra*). Only in the special case where the difference in value between A and all other options is less than the incremental cost of licensing will A be chosen (because no other option will be able to compete). Under our proposed policy, this will again yield a royalty (on A) just equal to the cost of licensing, which offers no profits (hence no incentives) for a strategy of nondisclosure.

The same is true in the case where all technologies are reasonably interchangeable and none is materially superior or inferior. In the presence of full disclosure, and given the absence of material differences in value between the best and the next-best alternatives, we would expect competition for selection to drive the royalty rate for whichever technology is selected toward a lower bound defined by the incremental cost of licensing.[143] Nondisclosure tilts the field toward A, which appears to be royalty-free. Competing technologies might even withdraw from the standard-selection process if their incremental licensing costs would exceed the small or nominal royalties they could expect in competition with A. Under our proposed policy, however, the post-disclosure RAND royalty for A will again be limited to the incremental cost of licensing and will yield no profits.

In sum, we believe that nondisclosure by standard-setting participants can be largely dealt with through the RAND obligation itself. As suggested above, nondisclosure of IP rights in a given technology can be dealt with by requiring the licensing of those rights at the incremental cost of licensing.

VI. CONCLUDING OBSERVATIONS

Our central conclusion in this article is that in a broad class of circumstances the self-interest of the participants in a standard-setting process may be relied upon to induce the adoption of appropriate safeguards that can preclude the acquisition and exercise of monopoly power by those who hold IP rights in the selected standard. This generally will be possible as long as: competition at the pre-selection stage is effective and is facilitated by the creation of auction-like selection conditions; reasonable (though not necessarily complete or perfect) information is available to those involved in the selection process; and participants are effectively bound by the commitment to license on RAND terms.

As we have explained, a RAND licensing commitment has two elements: RAND license terms must be reasonable *and* nondiscriminatory.

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[143] We are assuming that the costs of innovation in developing the technologies in question have already been sunk.

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Only rules that deal effectively with both issues yield results that are unequivocally defensible as appropriate public policy. We have suggested that a royalty be deemed "reasonable" for RAND purposes when it is or approximates the outcome of an auction-like process appropriately designed to take lawful advantage of the state of competition existing *ex ante* (i.e., in advance of standard selection) between and among available IP options. We have suggested that a royalty be deemed "nondiscriminatory" for RAND purposes when it satisfies ECPR conditions, which ensure that it is competitively neutral and offers no special advantages to any competitor in the final product market, *including the IP owner itself.*

We would hope that the operation of and interplay between these two approaches would be reasonably apparent based on the discussion developed in the body of this article. As we have explained, theory teaches that the two methods normally yield the same results, which is hardly surprising given that the *ex ante* auction approach is in effect a practical technique for identifying "reasonable" royalties, rather than an independent source of economic principles distinct from those embodied in the ECPR formulas. In practice, of course, only one or the other approach may be usably available in a given situation. For example, even when *ex ante* competition is strong, an SSO may fail to capitalize effectively on it, with the result that there may be no precise or administrable limits on reasonableness in the first instance. When an SSO takes no steps at all to structure that process to facilitate effective *ex ante* competition and generate competitive "reasonable" royalty data, some might question (at least when there has been no fraud or misrepresentation in the process) whether there is a policy rationale for depriving the IP holder of the return to innovation accruing to the bottleneck monopoly power that market participants have essentially thrust upon it by failing to take practicable measures to constrain supracompetitive pricing.[144] Yet ECPR is potentially helpful in the event the choice is made to try to determine the competitive "reasonable" royalty level. Recall that the "reasonable" royalty is equal to the ECPR level calculated by reference to the competitive final product price $P_{f,i}$* (assuming that downstream producers are equally efficient). If a reliable estimate of the latter price is available from the period before standard selection and if the necessary incremental cost data are on hand, then ECPR can supply the appropriate royalty calculation. In any event, even if the IP holder is permitted to retain bottleneck market power, ECPR has a prophylactic role to play in guarding against the discriminatory exercise of that power.

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[144] *Cf.* United States v. Aluminum Co. of Am., 148 F.2d 416, 429 (2d Cir. 1945) (no violation of the Sherman Act when "monopoly may have been thrust upon" the defendant).

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Finally, throughout this article we have assumed that RAND commitments are "binding" obligations (subject to certain specified exceptions) without identifying the institutional means or machinery by which they are actually enforced. Enforcement options include SSO self-regulation, common law contract and fraud remedies, copyright and patent litigation, as well as public and private (treble damage) antitrust proceedings. Choosing among these options is a topic that calls for a separate and thorough analysis. One ought not presume, however, that antitrust intervention is necessarily more nimble or sure-footed than other (less intrusive) legal or private remedies.[145] This article demonstrates how privately imposed RAND obligations, properly interpreted, can further antitrust objectives, such as constraining the creation of market power through standard setting and discrimination that forecloses efficient competitors.

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[145] Antitrust enforcement must always proceed with particular caution when touching on the intellectual property system in light of the acknowledged importance of innovation to the U.S. (and world) economy. See James E. Rogan, Under Secretary of Commerce for Intellectual Property and Director of the United States Patent and Trademark Office Prepared Remarks at the FTC/DOJ Hearings on Competition and Intellectual Property Law and Policy in the Knowledge-Based Economy, at the Hearings on Competition and Intellectual Property Law and Policy in the Knowledge-Based Economy, Washington, D.C. (Feb. 6, 2002), available at http://www.ftc.gov/opp/intellect/rogan.htm)), and in view of the need to avoid adopting or applying antitrust rules in a manner that unduly chills the creation and exercise of the legitimate rights bestowed by the patent, copyright and other intellectual property laws.

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